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8 March 1984

USSR Report

MILITARY AFFAIRS

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USSR REPORT

MILITARY AFFAIRS

CONTENTS

ARMED FORCES

BASE SECURITY CONDITIONS REFLECT CARELESS ATTITUDE

Moscow KRASNAYA ZVEZDA in Russian 22 Dec 83 p 2

[Article by Col V. Polezhayev, KRASNAYA ZVEZDA correspondent, in the column "Reflections on the Fact": "Gaps of Carelessness"]

[Text] It is unlikely that any of the N-unit officers would believe their eyes if they were to observe a scene such as this: closing up shop at the end of the day, the proprietors, as one would expect, bolt the entrance to their store. But, the other door, the service entrance--they leave wide open. One has to assume that each of them would be both surprised and shocked. This would be a natural and completely understandable reaction.

But here is a bizarre twist: in this very same unit, a scenario featuring similar "open doors" has been played out over the course of several years and has not elicited any reaction from a number of officers, including Majors V. Mikhaylov and G. Avanov.

Judge for yourself. The area which the unit occupies along with its barracks, depots, shops and other structures is surrounded by a primary enclosure made from heavy concrete slabs. The gate at one end of this enclosure is monitored by a secure checkpoint, which restricts passage to pedestrian or vehicular traffic having a special pass, while the other, rear gate is left open to traffic and is neither guarded nor monitored. Using this entrance, anyone who has a mind to can enter the grounds of the installation.

I discussed this subject with many of the officers having direct responsibility for security at the base. Among them were Majors Avanov and Mikhaylov. They both agree that the situation cannot be considered normal and they make additional assurances that they have taken every step within their powers to institute proper security.

After I had managed to pinpoint the specific measures which had been taken, I was left to consider the extent to which people ofttimes lose their sense of proportion in evaluating their own actions. As it happens, the following work was recently carried out in this area: First of all, a gap several meters in width which had existed earlier in the fence was reduced to one meter. Secondly, notices were posted on the inside of the fence warning that "...walking dogs on the grounds of the base is strictly prohibited."

But why was there a gap of about one meter in width left in the fence? Major Avanov confirms that "it should have been sealed up by the KECh[billeting and maintenance section], but they can't spare the workmen to do it." But others who bear no responsibility for the condition of the fence were far more outspoken in discussing the matter. This gap, according to them, is needed quite simply as a shortcut to work for certain officers.

Commentary, as they say, is superfluous.

This much is common knowledge: whenever attention to duty is allowed to slacken, any deviation from standards in one area will result in unavoidable similar deviations in many other areas as well, including those of major importance.

On more than one occasion, I happened to notice that on the grounds of the aforementioned installation and also near the barracks electric lights were left burning in broad daylight. I could not help wondering why no one paid the slightest attention to this. In conversations with soldiers, sergeants, ensigns and officers, I heard a wide variety of explanations. But they all came back to one and the same thing: in these sub-units, questions of economy and thrift are not brought up and no effort is made to instill diligence.

This situation also speaks for itself. One need only walk up to the enclosure about which we have been speaking, stand next to it, and soon it will become clear: first-term servicemen, when going into town from the base, frequently make use of exits other than the traffic checkpoint...

I should point out that I had intended to write about this matter for a long time, but kept putting it off. The reason I did so was that soon after my first visit to the unit, I had a discussion with the superiors of the officers whose names have been mentioned here. At that time, they specifically requested that I not write about the gaps in the fence, and gave their assurances that proper security would be established within a very short time.

Several months have passed since then. What changes have taken place in the unit with regard to this situation over the course of this time? While paying a visit there recently, I satisfied myself that everything is just as it was before. As a matter of fact, an attempt had been made to fill in the infamous gap in the fence, but this brick-work patch was put up in great haste and soon fell apart. Upon the snow which lightly covered the fallen bricks lay a well-travelled path.

Passing the barracks, I noticed a vivid placard bearing the advice that while the observance of proper procedure requires not the least capital investment, the benefit derived is enormous. In that same spot, near the entrance to the barracks, a lonely light bulb was burning in the daylight. And it occurred to me at that moment that, in addition to the secret passage in the fence, many other breaches--what might be called unseen gaps--continue to be in evidence here. They are gaps of complacency and carelessness.

Hanging up a striking placard(even though it is of some importance) is simply not enough--nor is being filled with good intentions. They must always be accompanied by concrete efforts toward organizational efficiency.

9481

CSO: 1801/178

ARMED FORCES

OFFICER CRITICIZED FOR SUPERFICIAL APPROACH TO TRAINING PRACTICES

Moscow KRASNAYA ZVEZDA in Russian 3 Jan 84 p 2

[Article by Col M. Andreyev in the column "Practical Application of Advanced Know-How": "But What Is the Payoff?"]

[Text] Senior Lieutenant V. Savel'yev was disconsolate: his unit had lacked the "little bit extra" it needed to be rated outstanding. His rival in the competition, Sr Lt N. Sokurenko, had been more fortunate: his specialists performed with greater coordination in the final examination, receiving a grade of five. Had not Savel'yev's unit suffered the disappointing failure in executing the final tactical exercise, which required each man to act precisely in accordance with instructions, it too would have received a five. But, unfortunately, not all of the specialists displayed the degree of preparedness necessary to act with speed and accuracy within strict time limits. The culprits were Lt M. Tarakanov and Warrant Officer S. Bereznya, as well as their subordinates.

"All right," thought the distraught Sr Lt Savel'yev, "now they will not graduate with me from the training class..."

A month and a half had passed since the conclusion of the examination. A new school year had begun. Savel'yev was true to his word: the crews commanded by Lt Tarakanov and WO Bereznya went through training, as they say, by the sweat of their brows. As a matter of fact, however, Savel'yev, as the unit commander, gave less of his attention to the remaining crews, though, from his point of view, he had no alternative. His ambition was not merely to draw even with the commander of the neighboring unit, Sr Lt Sokurenko, but to pass him as well. He has every possiblity of doing this. All that is necessary is to impose stricter requirements on his subordinates. Sokurenko, after all, does not specially select any of his personnel, though one must admit that they handle complex equipment with great proficiency.

Without notice, several staff officers and members of the methods committee turned up at one of Lt Savel'yev's training classes. He surmised immediately that they were checking to see if the inadequacies in crew training revealed in the final exam were being remedied. In an effort to show that their suspicions were unwarranted, Savel'yev arranged his training plan to make use of tactical exercises similar to those assigned in the final examination. He was betting that this time the crews would perform with greater confidence and coordination.

But the staff officers observing his training practices had apparently formed a different opinion. At the critique, Savel'yev did not hear the praise that he had expected. Instead, he found himself on the receiving end of more than a few pointed rebukes. Then, at the end, Major N. Timoshin asked him:

"Do you know of the methods being employed by your neighbors? Have you had occasion to observe Sr Lt Sokurenko's classes?"

Why, of course he would not do such a thing! And as far as their methods were concerned, naturally he was aware of them. Sokurenko employs a number of methodological innovations, and he--Savel'yev--was sufficiently conversant with them. Quite naturally, he simply borrowed them for use in his own unit. There is, for example, the Sokurenko-originated algorithm for optimizing the coordination of crews. How is it that it also happens to be here, in a training class? Or another example--the composite questionnaire: an idea which is also credited to Sokurenko. Why, of course, there it is--the control terminal--in operation!

Sr Lt Savel'yev freely discussed all of this--even with a peculiar sort of resentment: in his view, there is no way that he can be reproached for inattention to progressive methodology. And, in a superficial sense, this could be so. Savel'yev was completely familiar with all of the innovations generated by the competition leaders. Nonetheless, he makes rather ineffective use of them. It is his attitude that later on we shall find the time to thoroughly investigate these innovations, but right now the most important thing is to get on with training.

But no, the implementation of advanced methods will not tolerate a superficial approach. It was not altogether accidental that Savel'yev had lacked the "little bit extra" necessary for his unit to receive an outstanding grade. The search for this same "extra bit" led as well to the young commander's attempts to make use of his neighbor's methods in a purely mechanical fashion: what he saw, he attempted to imitate. But what is to be the payoff from the innovation? This he did not consider, did not analyze in any depth.

Sr Lt Savel'yev was, in fact, preoccupied with the training of his subordinates. Meanwhile, the reasons for their failure on the exam lay not only in the fact that these specialists were lacking in practical skills, but also in that their knowledge of theory was weak.

The composite questionnaire for crewmembers is one of the best aids to a training instructor for testing the knowledge of his pupils. All that is required is to provide the specialists with forms containing multiple-choice answers, then carry out certain manipulations on the terminal unit--and the whole picture appears before his eyes: who has mastered the material, and who has not. When Savel'yev saw this control terminal in Sokurenko's classroom, he was beside himself: what a truly useful item!

However, Sr Lt Sokurenko has advised that the control terminal is useful for testing student knowledge only with regard to certain questions, as he explained to a friend. For example, when testing knowledge of quantitative properties...

When dealing with other matters, e. g., the operation of a piece of equipment, the physical process taking place within it, personal communication is needed...

Sr Lt Savel'yev wrote down and sketched out everything he could. A nearly identical control terminal was assembled for use in his unit, with the aid of which Savel'yev determined to check the knowledge of his subordinates over the entire range of the training program--an approach which was systematically incorrect and which soon produced a negative effect on the level of knowledge among specialists in the unit.

A similar occurrence was seen with the algorithm for optimizing crewmember coordination. Under Sokurenko, it was developed and put into continuous use, while with Savel'yev, the training charts have never been completely worked out and are now gathering dust in the files. They may be useful for illustrating the essence of the algorithmic approach to optimizing coordination, but they could not possibly be of any use in teaching soldiers to work cooperatively, or to develop a sense of closeness to--and an intuitive understanding of--their comrades. This is because the training charts were put together in a careless and haphazard manner.

Inevitably, some other officer will fail to delve deeply enough into the essential meaning of advanced methodology, will not analyze it in sufficient detail. He will then wonder to himself: why is it that my methods are not working? Sr Lt Savel'yev's mistake was in keeping the new teaching aids developed in the unit locked up in his classrooms as if they were exhibits for a report: the commission would show up, and he would display them...

At the same time, the implementation of advanced know-how will perforce demand a thoughtful attitude and enormous creative effort.

9481
CSO: 1801/178

SOVIET WAR MOVIES CRITICIZED FOR LACK OF REALISM

Moscow KOMSOMOLSKAYA PRAVDA in Russian 10 Jan 84 p 2

[Article by O. Kuchkina: "Not About War..."]

[Text] Controversial remarks concerning some war films[boldface]

The M. Gorkiy Film Studio has released four pictures, one after another, devoted to the Great Patriotic War. There is no need to expand at length on the importance of this subject: attention to this theme is certainly essential and no doubt full of noble purpose. Just as any growing organism requires certain nutrients, from a moral standpoint, every growing young person feels the need for a particular spiritual sustenance. What his country went through, what his father went through, what he himself would have gone through had he been living at the time of the events which, in fact, made it possible for him to be here today--when he gives thought not only to what they owe him, but what he owes them(if, indeed, he has learned to think that deeply!)--this whole range of questions surfaces in some form or other around the age of 16, and later, when art "turns his eyes" toward the fateful forties.

The young man before the war, and the young man during the war--these themes are very well represented in our literature from this time and about this time. We need recall no more than a few of these works--let us say, "Volokolamskoye Shosse"[Volokolamsk Highway] and "Den' Komandira Divizii"[Day of the Division Commander] by Aleksandr Bek, "Krik"[The Cry] and "Ubity Pod Moskvoy"[Killed at Moscow] by Konstantin Vorob'yev, or "Nezhniy Vozrast"[Young and Green] by Aleksandr Rekemchuk. The realism of war and pre-war life has been recreated in these works in diverse form, including all of the arduous, severe and human, but in every case, realistic details.

The films adapted from these same proseworks differ markedly from their sources. The distinctions exist not so much in reworking of subject materials, but in a striking lack of realism and faithfulness to the originals, in that "generality" which is so deadly for works of art.

We first encounter the hero of the Rekemchuk novel in 1937, when he is 8, and we leave him in 1945, when he is 16. The idiom employed here is the actual experiencing of major historical events by the hero when he was "young and green." But in what sense are these individuals to be considered "young and

green" in the film of the same name directed by Valeriy Isakov, when initially they are finishing specialized artillery training, to be followed later by another artillery school. This is rather nonsensical. How much better for them had they experienced some trying circumstances--created for them through the use of artistic license, in order to establish a sense of contrast with the title--but, unfortunately, there was nothing of the sort.

Admittedly, the selection of the young actor, Yevgeniy Dvorzhetskiy, for the leading role seems on the surface to have been a wise one. Indeed, this slender, wide-eyed, highly cultured young man, standing side-by-side with his elders, takes on his own narrow shoulders the entire weight of the war--at the front as well as the rear. The trouble is simply that, as the hero, he is given absolutely nothing to do in this film. There is an endless series of meaningless, unessential frames, a great many poorly and amateurishly played scenes, and, in fact, there is nothing which could grab a viewer's attention or linger in his memory. We see him as he makes his way through the city, meeting a girl, meeting another young hero with another girl--they waltz, once, twice, three times--judging by this production, waltzing was the rage at that time. Where is all this leading to? What objective is this film pursuing, not to mention achieving? The central characters are so limp and colorless with their unrevealed (dramatically unexpressed) feelings and relationships, as well as their disconnection from a context of genuine realism, that the viewer is constantly being reminded of their stilted, artificial nature. He is not given to understand why he should sympathize with them, on what basis he should suffer for them. How did their classmate die at the front? How did their fathers die? But this information is supplied only as a matter of fact; the experience itself is not lived, not suffered through, because it is not provided in a realistic context. No, the one and only thing which might redeem this film--a heart-rending sympathy for this young boy (who might be dead tomorrow)--just never develops, is never evoked.

Every production lives through the energy of its creators. The ancient artistic motto, "I cannot be silent," is applicable to an artist of any significance. Alas, this lengthy film leaves the impression that its authors were fully able to remain silent. It is all the more disappointing since the name of the author of the novel appears among the film credits.

I must confess that at first I had the idea that it might be better to review war pictures for the benefit of servicemen, or perhaps even for those who had experienced it personally. Then, it occurred to me that these pictures are addressed to today's young people, who have never seen war; and in this respect, we were on an equal footing.

To illustrate, the picture, "Ekzamen na Bessmertiye"[The Immortality Test](written and produced by Aleksey Saltykov), shows the defense of Moscow in 1941, and while viewing it, I could not shake a peculiar feeling of puzzlement. A Kremlin training company, having no time to take its final exam, is sent to its assignment during the country's most trying moment--as the fascists are breaking through the front near Moscow. The students march off to their destination with shiney new buttons on their brand new overcoats, the smiles on their young faces belying their imminent deaths. But there is already something disturbing in

these initial sequences. German aircraft approach, followed by the command: "Get down!" The camera moves in to intently--perhaps too intently--examine a mud-spattered young face. Dramatic emphases. There is excessive dependence on them. The picture uses far too many of these unnecessary and heavy-handed devices; they do, in fact, take up a considerable part of the film, causing its digression onto a rather curious--to say the least--side street. The film disintegrates into separate episodes which are weakened not only by tenuous interconnections, but by the disturbed logical and psychological relationships within each episode.

For instance, there is the first meeting of the young commander, Aleksey Voronov, with Marinka, the stockgirl, who is closely guarding a pair of felt boots in an old church in the town near where the company has dug in. What do they talk about? "Do you work as a stockgirl there?" "Will I receive a receipt?" (for the boots) A perfectly normal conversation, it would seem. However, it is absolutely inappropriate to the facial expressions and emotions of the actors (Andrey Aleshin and Dar'ya Mikhaylova). They deliver these lines while playing--at the discretion of the director--a love scene. What results is absurdity--not a secondary plot--but total absurdity. Similar "discrepancies" continue to crop up throughout the film. We would expect the lines spoken by Captain Ryumin (Aleksandr Kazakov) to be directly related to the plot, and what takes place therein to be related to the expression on his face--not in this picture. Possibly, the director followed this line of thought: external events--conversations, commands--are one thing, but the internal life of the main characters is quite another--which can be expressed, revealed through the use of mimicry, gesture, pose. What has resulted is an insufferable mistake. "Is it shrapnel?" asks Aleksey Voronov, after hearing the first bomb blasts and seeing for the first time the upturned earth around him. His companion draws out the "psychological" pause for some time, wiping the mud from his hands with a snow-white handkerchief, before replying: "Shrapnel." Such directorial exercises are distressing to watch. Exploiting the theme of Moscow in the Fall of '41 for such purposes is wholly inappropriate. Invariably, Aleksey's "amorous" flights to Marinka evoke, not sympathy, but a sense of shame--not because such things could not have been, but because of the way it is shown. With all the attention being paid to dramatic emphasis, it turned out that the main emphasis was misplaced: one gets the impression that Aleksey arrived in the trenches primarily to make love to the girl, and only secondarily to defend Moscow. But, despite whatever affected, "romantic" or "refined" stylistic form the producer selects for himself, we cannot forget the reality of the war, with its real blood and the real horror of the surroundings. As a matter of fact, the producer also remembers this. How else to explain why he regales us with horror as well. But, here again, the horror is calculated, given a predetermined emphasis, as he evidently stages it as if it were an end in itself. And really, the scene with the German aircraft flying in to the sound of the fascist martial anthem--a pale imitation of "Apocalypse"--I could only throw up my hands in exasperation.

I do not wish to leave the impression that the picture is altogether devoid of well-executed scenes. They are there. It's just that they are few in comparison with what those in the cinema refer to, albeit crudely, as "groaners."

The mistakes made by the makers of films such as this one are particularly glaring when one looks at the film, "Day of the Division Commander," which is dedicated to the same period of the war (scenarist, Vasiliy Solov'yev; producer, Igor Nikolayev). Two points are responsible for the success of this film: the image of the central character, and the brilliantly recreated realism of day-to-day life. Valeriy Tsvetkov, whom the director discovered in the Tashkent Russian Drama Theater, proves himself an actor of rare ability. He doesn't play the role of the commander of the guard division, General Beloborodov,--he lives it. The way he talks to his superiors, and to his subordinates, the way he thinks out loud, the way he shows nervousness, the way he gives orders, the way he interrogates his troops, the way he dresses down a commander--every single movement rings true. And it isn't simply the truth that he transmits, but a rich volume of characterization: intelligence, wit, rigidity, courage and wisdom.

Beloborodov had promised the deputy director of a textile factory (which had long since been evacuated and was now occupied by a single old woman who had stayed behind to guard the only home she knew) that, unless he had absolutely no alternative, he would try to avoid firing on the factory. But, a gunnery officer, who was fed up with the old woman, ordered her to: "Get away from the target!" And he announced that it was to be demolished. The woman went pleading to Beloborodov with tears in her eyes. The general called the gunner on the carpet. The officer said that he had been joking. The blood rose into Beloborodov's face. "Who do you think you are fighting this war for?" he asked. The gunnery officer mumbled something in reply. Beloborodov: "For that very same little old lady--that's who."

It seems to me that had the screenwriting been a little more vivid, a little stronger, more forceful, it's entirely possible that we would be hearing talk of the birth of a new Chapayev in the cinema. Be that as it may, a highly accomplished, authentic national hero has appeared on the scene. However, in all probability, this could have been a different picture. Its excellence is due to its strict adherence to careful documentation, and to its transmission of wartime reality through a wealth of detail. The only flaw--from my point of view--is the portrayal of the writer by Vyacheslav Yezepov. The film itself is taken from the prose of Aleksandr Bek--thus, it is being overviewed by another figure...

The young filmgoer is desperately in need of pictures which, despite their lack of excessive and inspirational dialogue and scenery (which all too often bypass the heart as well as the ears), and no matter that they take no particular moral stand or try to prove no point, are nonetheless adequately informative. Not only in the manner in which one conducts oneself in war--in situations of extreme danger calling for split-second decisions--but also regarding personal conduct in general, how to live one's life.

But, while extreme danger and split-second decisions were used as the backdrop and the focal point, respectively, in the film, "Shel Chetvertiy God Voyny..." [The Fourth Year of the War Has Passed](produced by Georgiy Nikolayenko, with screenplay by Aleksandr Belyayev), it was, unfortunately, to the detriment of everything else, including an occasional sensible idea. This time, we are

watching a military detective story, so to say, without any reference to the setting. A certain military unit is ordered to advance through a certain Dense Forrest. Our forces, however, conjecture that the enemy is preparing to employ a certain stratagem there. What sort of stratagem? This is what our recon-team is supposed to find out. The "game" begins. "Our" forces play with "theirs" and "theirs" with "ours." The plot thickens as "ours" disguise themselves as "theirs" although "theirs" already know that "ours" are disguised as "theirs," while "ours," for their part, know that "theirs" know... "Theirs" permit "ours" to pass through into the "zone." "Ours" advance. "Theirs" intend to close with "ours" later on, although there is no reason for not skirmishing with them immediately (but then, there would be no film). Before they are killed, our troops transmit a radio message in the clear that the enemy intends to torch the Dense Forrest.

The point is not that something like this could not have happened. Although, if the alleged burning of the forrest actually took place during the war, it would have been proper to cite references to this event. And if the entire story was invented from beginning to end... Well, that is a matter having to do with the author's conscience. The point, I repeat, is to be found elsewhere. Specifically, in the fact that so much screen time is lavished on the "game" and even on its numerous minor "lateral moves," that there is simply none left for the people, for the characters. Here we have the actor playing the role of a member of the recon-team, Zhurba, who spends considerable time performing a song before being sent on the reconnaissance mission. He doesn't just sing--he performs. This time could have been more profitably spent on some character development! But, no. Forget the characters, forget about examining individuals or their fates. The ending itself is effective; there is no dialogue, and Lyudmila Savel'yeva is quite touching. It's not her fault, nor that of the other actors for that matter, that the material is lifeless--but, as a result, we have been given, not real, living beings, but rather figures, game pieces which are manipulated by the invisible hand of the author.

In all ages, the time of youth has been closely associated with issues, not only of a personal, but also of a general and eternal nature, inasmuch as this is the time in which lifelong attitudes and ideologies are formulated. Today, the personal, general and eternal combine with other world issues such as the continuation of life on earth. Consequently, the lessons learned from the Great Patriotic War are particularly relevant. And it is not the "firebrand" of some plot which guides the artist, but his own fiery blood and a deeply personal sense of his own capability.

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CSO: 1801/178

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Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 3-4

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KAL INCIDENT ASCRIBED TO U.S. RECONNAISSANCE PRACTICES

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 9-16

[Article by Lt Gen I. Perov and Engr-Col A. Fedorov: "American Reconnaissance in the Service of Washington Provocateurs"]

[Text] The flight of the South Korean Boeing 747, as organized by the United States to carry out special missions in the airspace of the Soviet Far East during the night of 1 September 1983, shows that the increased aggressiveness of the foreign policy carried out by the American administration has been accompanied, along with unprecedented military preparations, by the greatest possible increase in the subversive activities of the U.S. intelligence services. "The United States," pointed out Comrade Yu. V. Andropov, "has resorted to unceremonious interference into the affairs of other states, imposing the American way of life on them and in essence is endeavoring to achieve world domination. Here truly is the root of the evil created in the world, an evil threatening the very existence of people."

Over all recent history, the basic content in the activities of American intelligence has been anti-Sovietism and the struggle against the forces of peace, democracy and socialism. According to the eloquent admissions of American intelligence officers themselves, it has always been "anti-Soviet, anticommunist, anti-Marxist and...antileftist."

Washington has officially assigned intelligence the role of the most effective, in its opinion, instruments for carrying out foreign policy and it holds a place somewhere between diplomacy and outright military intervention. Even in 1977, Carter, immediately after taking up the position of president, in line with the issuing of an order on the usual reorganization of the intelligence services, stated: "The military forces, of course, are the central support of our strength. Our intelligence community should be another important support."

Each year the military-political leadership of the United States allocates enormous amounts of money to maintain its excessively inflated intelligence apparatus running into many hundreds of thousands of people. At the end of the 1970's, the allocations reached 20 billion dollars. However, the present Washington administration has found these astronomical amounts insufficient. As a result, according to information in the American press, under the Program for Technical Means for Collecting Intelligence Data it has been considered necessary to increase allocations by 1.5 billion dollars a year. Around two-thirds

of the "intelligence community's" budget goes for espionage against the USSR and the other Warsaw Pact states. "I do not want to leave any room for doubt that the Soviet Union is the main object of intelligence and should remain so," stated the then CIA director Turner in 1978. The entire arsenal of means and methods employed by the U.S. intelligence services is used precisely for these purposes including from inadmissable covert activities by American diplomats accredited in the USSR to the conducting of systematic reconnaissance by the most modern equipment.

What is American intelligence? As is clear from the data in the foreign press, this is a wide-flung system of special bodies and services which in organizational terms are part of different departments and agencies of the nation and in operational terms are considered as part of the so-called "intelligence community" headed by the director of Central Intelligence. This includes, in addition to the staff of the director: the Central Intelligence Agency headed by the director of central intelligence; the intelligence bodies of the Defense Department (the Defense Intelligence Agency or DIA and the National Security Agency or NSA) and the Armed Services (Army, Air Force and Navy); the intelligence bodies of the FBI, the State Department, the Department of Energy and Treasury as well as a number of other institutions.

The basic body of the "intelligence community" is the CIA which is under the control of the National Security Council (NSC) and the U.S. President. According to data in the foreign press, its personnel includes 18,000 permanent employees (with headquarters in Langley), thousands of agents within the country and abroad, over 100 residences and supply bases, and many thousands of employees covered by diplomatic, correspondent and other positions, including around 1,500 State Department employees abroad. The CIA conducts military-political, economic and scientific and technical intelligence on a global scale employing chiefly covert methods. The CIA has been the organizer and direct participant in psychological warfare against the socialist countries and the national liberation movements. Since the start of its activities, the main U.S. espionage agency has practiced secret interference into the affairs of other states by carrying out active political, propaganda and paramilitary subversive actions.

Around 150,000 persons are employed in the Pentagon's intelligence bodies (the DIA, NSA and the intelligence services of the Armed Forces), according to foreign press information. In peacetime these carry out intelligence activities basically by employing various technical devices, both specially developed for espionage purposes as well as those involved for intelligence activities, in particular using scientific research and commercial vessels and aircraft, including passenger aircraft. According to data in the American press, the ground electronic intercept and monitoring stations, space, air and ship intelligence equipment are constantly monitoring the state and activities of the higher state and military leadership bodies, the Armed Forces as well as the military and industrial installations of the Soviet Union.

The NSA alone has more than 2,000 ground radio and electronic intelligence stations. The most powerful centers and installations are located on the territory of nations adjacent to the USSR, including Norway, Turkey and Japan. At present, they are being built also in Pakistan. Also involved in intelli-

gence gathering activities against the USSR and the other Warsaw Pact countries are the more than 80 radar installations of the NATO Nage automated control system in Europe. In the East, for these purposes they employ, in addition to American radars, also the radars turned over by the United States to the Japanese Armed Forces.

In the arsenal of information gathering equipment, the U.S. leadership has assigned a special place to space systems, viewing them as one of the most important means for conducting global strategic intelligence in peacetime. The reconnaissance satellites are entrusted with the carrying out of a broad range of tasks employing optical, electron optical, radio electronic and radar equipment. Western specialists feel that the most recent KH-11 photo reconnaissance satellites possess high resolution and transmit the obtained data virtually simultaneously with the photographing of the objects. In addition to the reconnaissance satellites, other military and commercial satellites are involved in conducting espionage, in particular those of the IMEWS system which are in a stationary orbit.

According to the Pentagon's plans, the possibilities of conducting reconnaissance from space are substantially broadened by carrying out the program for creating and operating the manned reusable spacecraft under the Shuttle Program. Even during the second flight of this craft, as was stated in the foreign press, radar surveying was carried out from it in individual regions of Soviet territory. These ships have also been used for testing out modern reconnaissance equipment. In the near future they plan to orbit advanced spy satellites from them.

Regardless of the ever-increasing (in the view of American specialists) capabilities of space reconnaissance, the U.S. military-political leadership has given significant attention to improving air reconnaissance devices which possess specific features in carrying out the tasks not only on a tactical but also on a strategic level.

Strategic air reconnaissance, as officials in Washington admit, is carried out around-the-clock and on a global scale. Its basic efforts are focused on securing information on installations located on the territories of the Soviet Union and the other socialist countries. Strategic air reconnaissance equipment has also been included as part of the interventionist Rapid Deployment Forces designed for actions chiefly against the Third World countries along our southern frontiers. The tasks of conducting strategic air reconnaissance have been entrusted primarily to the strategic reconnaissance aircraft such as the SR-71, U-2 and RC-135. They all have a great range and flight duration, a significant ceiling and are equipped with the corresponding electronic equipment and aerial photographic devices. Reconnaissance flights are made both from specially equipped airfields located on U.S. territory, including Alaska and the Aleutian Islands, as well as from carefully guarded, strictly secret air bases in Great Britain, on the Island of Cyprus, in Japan and South Korea. Periodically airfields in Norway, the FRG, Turkey and a number of other states are also used.

The SR-71 and U-2 were specially designed as reconnaissance aircraft. The first is known not so much for its good flight performance (a flight altitude

up to 30.5 km and a maximum speed of 3,220 km per hour) as it is for instances of its numerous violations of the airspace of many sovereign states, in particular Cuba and North Korea. According to information from the Central North Korean Telegraph Agency, in 1982 alone, this type of aircraft intruded 187 times in the nation's airspace. Here it is wise to point out that each such flight over the territory of a foreign state must be personally approved by the U.S. president. The U-2 reconnaissance plane has equally lamentable renown. The attempt by this air spy to carry out with impunity (relying on the "unreachable" altitude with a service ceiling of 26 km) a flight over the Soviet Union in 1960 ended ungloriously in our peaceful skies. At present, U-2 are constantly on alert duty on the one of the basis in Great Britain and also make their appearance at airfields of other states. From information in the Western press, the U.S. leadership has constantly sought official approval from the Turkish government to base the U-2 on its territory.

The RC-135 electronic reconnaissance jet developed on the basis of the Boeing 707 passenger liner is a sort of flying reconnaissance laboratory with a crew of around 30 men. As a total there are at least a score modifications of it capable of carrying out a broad range of intelligence tasks, including monitoring the test launches of Soviet carrier missiles, compiling radar maps of the terrain, recording the operating parameters of electronic equipment on Soviet territory and so forth. Here American strategists have given particular attention to reconnoitering installations located in the areas of the Far Eastern frontiers of our motherland, using for the espionage flights the Japanese Kadena Air Base on the island of Okinawa, the South Korean Osan, as well as the U.S. Air Force Base at Ayelson in Alaska and the military airfield on Shemya Island.

The E-3A early warning and control aircraft (the AWACS system) are widely employed by the U.S. and NATO intelligence services for conducting strategic air reconnaissance. Equipped with powerful onboard radars with a range of over 600 m and other radio electronic equipment, these make regular flights along the western frontiers of the Warsaw Pact countries as well as along the eastern limits of our country, operating from air bases in Japan and South Korea; periodically they are relocated to the Near and Middle East for carrying out reconnaissance tasks. In the near future it has been proposed that they be stationed on Turkish territory. The number of these aircraft has been constantly increasing, and by 1985, the U.S. Air Force should have around 40 of them and NATO should have 18.

The Pentagon also uses the B-52 and FB-111 bombers as well as the KC-139 tanker planes for strategic air reconnaissance.

On the level of carrying out strategic-type tasks, the American military has placed great hopes on the so-called TR-1 tactical high-altitude reconnaissance plane developed by the Lockheed firm on the basis of the already mentioned U-2. Its onboard equipment includes infrared and electronic equipment providing for the conducting of reconnaissance during the day and at night under any meteorological conditions. Since 1962, TR-1 aircraft have begun to be received by the Strategic Air Command of the U.S. Air Force. One squadron of these flying spies is to be stationed at an American base in Great Britain.

The forces and means of the American Navy intelligence services are diverse and numerous. In their activities, as the foreign press has announced, primary attention is given to discovering the basing system, composition and state of the USSR Navy to constantly tracking the movements of Soviet naval vessels and to ascertaining the content, focus and intensity of operational and combat training. The reconnaissance involves submarines and surface ships, shore based patrol and carrier aviation, specially equipped naval vessels, ships of the maritime and fishing fleets, spacecraft, sonar observation systems, the shore radio electronic reconnaissance units and special reconnaissance and sabotage forces.

Upon the admission of the very representatives of the American special services, in their espionage activities they allow a possibility of violating the airspace and territorial waters of the USSR, particularly in the Far East. Thus, in a bulky study published in 1982 on the activities of U.S. intelligence, John Prados wrote: "The navy does not reject the employment of ships for reconnaissance purposes. In the Holiston Operation conducted from the beginning of the 1960's to the mid-1970's, nuclear submarines of the "Sturgeon" class were employed with additionally installed special equipment and carrying NSA personnel. Reconnaissance activities were conducted along the Soviet coast." At that time when boats of the "Sturgeon" class were carrying out the Holiston Operation, American over-the-horizon radars located in Japan and the Philippines were constantly monitoring the territory of the Soviet Union.

Recently, judging from statements in the foreign press, the activities of the U.S. special services close to Soviet military installations, sea and land frontiers in the Far East have become even more active. For monitoring the test launches of Soviet missiles, U.S. espionage services, in addition to the existing powerful radar stations in Alaska and the Aleutian Islands as well as other tracking devices, have begun to employ RC-135 reconnaissance aircraft equipped with modern radio electronic equipment and which under the Cobra Ball Program make flights directly along our frontiers. In 1982, the missile and spacecraft tracking vessel "Observation Island" joined them, making regular runs from Pearl Harbor Navy Base (Hawiian Islands) to Kamchatka.

The Air Force and Navy reconnaissance measures are carried out against a background of the evermore frequent joint exercises and maneuvers by large contingents of ground forces, aviation and naval forces of the United States and its allies conducted on the Korean Peninsula, off the shores of Kamchatka and the Aleutian Islands and in the Seas of Okhotsk and Japan. In disclosing Washington's plans for reconnaissance and military activities in the Far East, the commander of the American 7th Fleet, Vice Adm S. Holkum, in an interview with the newspaper HOKKAIDO SHIMBUN, directly stated: "The U.S. 7th Fleet is shifting its activities into the northwest Pacific Ocean" (that is, toward Soviet shores). In this statement is the real goal, unconcealed by the stir about the "Soviet threat" and to achieve this Washington is willing to force its partners into the dangerous path of confrontation with the Soviet Union. For the sake of this the overseas strategists are ready to wager everything.

The already mentioned author of the research on U.S. intelligence services John Prados has written that in the course of the Holiston Operation close to the Soviet Maritime Province, ships of the Soviet Navy repeatedly detected

American nuclear submarines. What else except absurd can one call the actions of those who 10-15 years ago sent these submarines to the Soviet shores? And is not a similar viewpoint criminal to mankind being fostered by the present U.S. leadership, in organizing provocations analogous to the incident with the South Korean Boeing 747 in the Sakhalin area?

At a press conference in Moscow on 9 September 1983, the chief of the General Staff of the Armed Forces and USSR First Deputy Minister of Defense, Mar SU N. V. Ogarkov, emphasized: "It has been irrefutably proven that the intrusion by the aircraft of the South Korean airline into Soviet airspace was an intentional, carefully planned act." But Washington, as before, is doing everything to remove all traces and prevent the release of details about the provocation which was organized overseas. However, all attempts taken by the American administration to prove their noninvolvement in the incident are in vain.

The very fact of the immediate response from Washington and not from Seoul to the incident involving the South Korean plane and the contradictions in the assessments of the American president and the members of his government of what occurred in the Far East show that the flight of the Boeing 747 for espionage purposes was organized and supervised by the U.S. special services. One has merely to compare certain official statements by representatives of the American leadership over the provocative act to be convinced that they are an unpardonable lie, and on the highest level.

Thus, on 2 September, at a press conference, the Secretary of State Shultz categorically denied any "link of the South Korean airliner's flight with U.S. intelligence activities," but on 4 September President Reagan stated that at least one reconnaissance plane of the U.S. Air Force was involved in the incident. On 5 September the president in his speech over national television and a State Department spokesman, contrary to the assertions of the Pentagon leadership that the American RC-153 reconnaissance plane and the Boeing 747 never approached one another "less than 75 miles," were forced to admit that on 31 August both planes off the east coast of Kamchatka were in immediate proximity and precisely at the moment that the Boeing 747 was detected by the Soviet air defense system. It is perfectly obvious that their joint flight pursued the single aim of confusing the U.S. air defenses about the type of intruder aircraft. Subsequently, the American press began publishing statements that the U.S. Air Force reconnaissance planes had long been employing the international airlines for regular reconnaissance flights under the guise of passenger planes.

In their official statements the Washington leaders were also confused over the question of the nature of the reconnaissance activities carried out by the RC-135 spy planes. The permanent U.S. representative at the UN, Kirkpatrick, at a session of the UN Security Council on 6 September, classified the aim of their regular flights close to Kamchatka as an attempt to verify the Soviet Union's observance of the conditions of the Soviet-American agreements on strategic arms limitations. At the same time, a Pentagon spokesman said that the presence of the RC-135 in the area that the South Korean plane intruded in Soviet airspace was linked to its conducting of reconnaissance on the Soviet air defense system.

Nor do the stories quite jell in the statements by American leaders on the location of the RC-135 at the moment of the incident with the South Korean airliner over Sakhalin Island. Mrs Kirkpatrick assured the members of the UN Security Council that by this time it "for more than an hour was 1,500 miles away" at the American airfield on Shemya Island (the Aleutian Islands). Judging from Reagan's statements, the same aircraft by this time "had returned to its base in Alaska" located almost 1,000 miles from Shemya Island. However, the United Press International Agency and the well-known American commentator M. Getler stated, referring to officials, that at the moment of the incident with the Boeing 747 "the American reconnaissance plane was 1,000 miles from the site of the incident and, as before, was over international waters." Such confusion is not surprising if one considers with what hurry the highly placed White House representatives fabricated the rash versions which pursued just one goal, by any means to prove that the activities of the American reconnaissance aviation had no bearing on the flight of the South Korean intruder plane.

The Washington leaders were just as confused and resorted to any sort of lies in their rabid anti-Soviet insinuations, trying to place the blame on the wrong party and rest responsibility for the incident on the Soviet Union! Regardless of official Washington's statements that the Boeing 747 had initially been identified by the Soviet air defense system as an RC-135 and subsequently classified as an unidentified object, in the words of the State Department spokesman, "the Russians did not make serious attempts to identify the aircraft or warn it." But President Reagan at the same time was asserting that the Soviet "pilot in no way could confuse a Boeing 747 with any other and not see that a civil airliner was ahead of it."

In their unpardonable lie, representatives from the high echelons of the American government at times went to absurd lengths. For example, the Congressman J. Wright who was present at the White House organized playback of the so-called "recordings of intercepted conversation of the Soviet pilots," stated that the South Korean plane, judging from these exchanges, was taken to be an RC-135, since they "once mentioned a RC-135 and another time a target similar to the given type of aircraft but requiring identification." However, the Assistant White House Press Secretary L. Speakes, who listened to the "recording" together with J. Wright, asserted that there was not even an allusion to the American RC-135 air spy.

In referring to the same transcripts of the "conversations of Soviet pilots," Reagan and his closest associates asserted that the Soviet pilots supposedly undertook no measures to warn the crew of the intruder aircraft of its intrusion into Soviet airspace and did not demand that it land at one of the Soviet airfields. However, immediately after the press conference held in Moscow on 9 September, representatives of official American bodies "discovered" in these same "recordings" "unintelligible places" which, as it turns out, "could be" interpreted as a warning to the intruder aircraft or as an order from the Soviet pilot to follow him and as his "actions involving the warning firing of tracer bullets." In this instance, what are the official statements by a major power's leader who has been given full authority worth?

The lie by the U.S. leadership about what happened over Sakhalin Island has become even more apparent for the American public. The former American diplomat

C. Eisendrat wrote at the beginning of September 1983 in the newspaper PHILADELPHIA INQUIRER: "Deception seems a common procedure in the policy of the U.S. Administration.... Among Americans there is no reason to believe the government which is endeavoring to impose its own version on the incident involving the South Korean airliner and continues to deny that this aircraft was carrying out a reconnaissance mission over Soviet territory.... The South Korean airliner, in carrying out a reconnaissance mission, was afraid of being caught red-handed and tried to escape. Precisely this, in particular, can explain the refusal by the South Korean pilot to obey the Soviet fighters and land his aircraft on one of the Soviet airfields."

With the incident during the night of 1 September 1983, it became widely known that Korean Airlines had long been in the service of American intelligence. The American espionage agencies had noticed it and got their hands on it at the end of the 1960's when it was on the edge of bankruptcy. It was given financial and material aid, modern passenger planes, including of the Boeing class, were delivered at reduced prices, and a whole number of other privileges were extended, including lower ticket prices in comparison with the American airlines and the possibility of carrying a significant volume of air traffic between the United States and South Korea. KAL has received economically advantageous orders for assembling F-5 fighters and combat helicopters for the South Korean Air Force under American licenses as well as for repairing air equipment from the U.S. Air Force and Navy groupings stationed in the western Pacific. All of this has made it possible for the airline not only to avoid bankruptcy but to increase profits which at present have reached 150 million dollars a year.

As was stated in the foreign press, at the beginning of the 1970's, the CIA concluded a top secret agreement with KAL on equipping several of its planes, primarily the Boeing, with reconnaissance photographic and electronics equipment and for using them to conduct reconnaissance of objects on Soviet territory. The recruitment and training of pilots and engineering and technical specialists for KAL by the American intelligence services were carried out in the course of their training at the training centers of the American Boeing and McDonnell Douglas firms. For the CIA this task was facilitated by the fact that a majority of the flight and engineer-technical personnel in KAL were reserve officers in the South Korean Air Force trained in American and South Korean military academies and schools. The pilots of the South Korean Boeing 747 which intruded in the Soviet airspace were reserve officers including the captain of the crew, Col (Res) in the South Korean Air Force Chang Byong Ing and the co-pilot, Lt Col (Res) Song Dong Wing. After the incident over Sakhalin Island, information began to find its way into the foreign press that Chang Byong Ing had told close friends about carrying out assignments for American special services and even pointed out the reconnaissance equipment on his plane.

The foreign press stated that a majority of the KAL leadership had also been trained in American military and civilian institutions. Its vice president Cho Chung Gung had completed the U.S. Army Artillery College and the University of California. Half of the company's directors in the past had been officers of the South Korean Air Force. Its activities were monitored by the South Korean Ministry of Transport presently headed by a trusted figure in the South

Korean dictatorship, Gen (Ret) Li Hi Sang, a professional intelligence agent and former director of the KIA which was established upon orders and with the direct aid of the American CIA. Immediately after the failed large-scale espionage action against the Soviet Union, Washington undertook every measure to conceal the direct link of the American intelligence services with the South Korean airline's company. All publications on the given question were put under strictest censorship. This is not surprising.

As is clear from the statements in the foreign press, Washington's carefully planned reconnaissance operation directly involved virtually all the espionage agencies of the American "intelligence community": the CIA, DIA, NSA and the intelligence bodies of all the U.S. Armed Forces. Involved in it were significant personnel and equipment including, in addition to the South Korean aircraft, American RC-135, Orion, E-3A AWACS reconnaissance planes, surface ships, the Ferret-D reconnaissance satallite as well as ground and ship radio and electronics reconnaissance facilities. The intelligence services of Japan were also involved in the operation.

The scale of this operation and the number of personnel and equipment involved in it leave no doubt that its aim, on the one hand, was to carry out a whole range of intelligence tasks of a military strategic nature. Simultaneously, highly placed Washington provocateurs, in sending the South Korean airplane into Soviet airspace, pursued another criminally intentioned goal, that is, in the event of the failure of the operation to turn it into a large-scale anti-Soviet operation with far reaching political aims. Primarily it was a question of a desire to sharply increase international tension and create for Washington a cover in activating militaristic preparations. This espionage provocation should first of all distract the attention of the world community from urgent international problems to attempt to defame the peaceful initiatives of the USSR and to complicate the achieving of a mutually acceptable agreement at the disarmament talks and in a situation of a military psychosis to deploy new nuclear missiles in Western Europe.

As always, in such instances, the U.S. ruling circles selected the espionage agencies as the executor of this evilly intended provocation. And they are widely known for the methods of their work. Even responsible co-workers from American and other Western intelligence organizations have officially admitted that the United States has long employed the civil aviation of foreign states, including certain Western European countries, for intelligence purposes, primarily against the USSR.

Particularly blasphemous are the proclamations of President Reagan about the price of "human life" and who blessed the criminal action which sacrificed completely innocent persons! These sacrifices, pointed out Comrade Yu. V. Andropov in his Statement of 28 September 1983, lie on the conscience of those who wished to assume the right to disregard the sovereignty of states and the inviolability of their frontiers, those who conceived and carried out this provocation and those who literally on the next day hurried to push through Congress colossal military allocations for developing new piles of weapons of mass destruction, from the MX missiles to cannisters with neuroparalytic gas.

At present, there is an even more timely ring to the warning to the White House voiced by Comrade Yu. V. Andropov in his speech of 3 May 1983: "Under conditions when all mankind is threatened by nuclear catastrophe, the duty of everyone who is involved in the taking of political decisions is to put a concern for the maintaining of peace higher than everything. Is it not time for the American leaders to show greater political restraint, responsibility and reasonableness?"

As for the security of our state, as was stated by the USSR Minister of Defense, Mar SU D. F. Ustinov, "we firmly state that the frontiers of the Soviet Union are sacred and inviolable. We are always ready to stand up for ourselves. Any provocation will receive a proper rebuff!"

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NATO VIEWS ON EMPLOYMENT OF ARMED FORCES EXAMINED

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[Article by Maj Gen V. Kozhin and Candidate of Military Sciences, Col V. Trusin: "Questions of the Employment of Armed Forces in Operations (From the Views of NATO Specialists)"]

[Text] The foreign policy of the United States and the other imperialist countries in recent years has been aimed at undermining detente, exacerbating the international situation and accelerating the arms race for achieving NATO military superiority over the Warsaw Pact. For this purpose the military-political leadership of the North Atlantic bloc envisages the quantitative and qualitative development of the bloc's nuclear forces, improving the general purpose forces, substantially reducing the time for the strategic deployment of the NATO JAF [Joint Armed Forces] in the European theater of war (including shifting strategic reserves from the United States) and further increasing the infrastructure elements in the European theater of war.

In the course of modernizing the NATO nuclear forces, there are plans to deploy American medium-range missiles (up to 600 units) on the territory of the bloc's Western European countries as well as significantly increase the number of delivery systems for the tactical nuclear weapons and supplying them with more advanced ammunition, including neutron.

In the development of general purpose forces, particular importance is being paid to arming the troops with highly accurate weapons systems which are capable of effectively hitting personnel and combat equipment both in direct proximity and at a great range as well as automating the troop and weapon control processes and the mass introduction of ECM [electronic countermeasures] equipment.

In the European theater of war, joint commands have been established, control posts have been prepared, joint air defense and communications systems have been deployed and a very large grouping of armed forces is being maintained in a high state of combat readiness. As has been announced in the foreign press, this group numbers almost 3 million persons, up to 80 divisions and 90 separate brigades of ground forces, approximately 4,000 combat aircraft and around 900 ships in the basic classes, with all of these being able to be activated in the first operations. For making a nuclear strike, the command of the bloc's JAF

in Europe has approximately 1,000 medium-range nuclear missile carriers (1,000 km and more) with over 3,000 of these weapons.

In the course of the strategic deployment of the armed forces, the NATO JAF Command intends to significantly strengthen this grouping by the mobilization deployment of new formations in the European member countries and shifting reserves from the United States and Canada. In particular, in one of the command-staff exercises, by the start of combat operations its size had conditionally been brought up to 125 divisions, 100 separate brigades and 7,000 combat aircraft.

The NATO military strategy envisages the waging of both all-out nuclear war as well asa limited (conventional or nuclear) war in Europe against the Warsaw Pact countries. In recent years, under the impact of the concepts imposed by the Pentagon, the bloc's command has put a particular emphasis on preparing the JAF for combat operations without resorting to the employment of the American strategic offensive forces so as to safeguard U.S. territory against a retaliatory nuclear strike. One of the main strategic goals in such a war, from the experience of the exercises, is to defeat the grouping of the Warsaw Pact armed forces in Europe and on the Atlantic, without which it would be impossible to carry out the aggressive plans of the imperialist bloc. The NATO Command intends to achieve this goal by active offensive operations by all the armed services.

Considering the increased combat capability of the bloc's armed forces in the course of carrying out the long-range NATO program and the sharp rise in the role of operations employing conventional weapons, the NATO command has set specific tasks for itself and these should be achieved in the initial period of the war. In order to destroy the opposing enemy grouping in the very first engagements, as has been emphasized in the official manuals, it is essential to make powerful deep strikes against the enemy using all means, to conduct offensive operations, to stubbornly break through into the rear and outflank the enemy, to disrupt its entire logistical and control system and complete the rout of the disorganized units.

As the experience of the exercises indicates, the military operations of the NATO JAF are to be conducted on a scale of each of the European theaters of war in the form of operations carried out under a single plan and under the overall leadership of the chief command. The operation in a theater of war can include selective and massed nuclear strikes, offensive and defensive operations carried out by the field forces of the ground forces with the support of the air forces and navies simultaneously or successively on various axes, air offensive and defensive operations by the air forces, naval operations on the maritime theaters of war as well as air and amphibious assault operations. In assuming that initiative will be taken from the very outset of the war, Western specialists have asserted that the "first engagement" is not a "brief war" but rather a series of "extended operations." Thus, they do not limit the initial period of the war to strictly determined times. On the other hand, the NATO Command, in arming its troops with weapons of mass destruction, feels that their destructive factors can shorten the time for achieving the basic goals of the engagement from several days or weeks to several hours.

The strategic tasks which are to be carried out in the European theater of war by the grouping of the bloc's JAF objectively stem from the class goals of imperialism which is endeavoring to destroy socialism and establish capitalism as the sole socioeconomic system in the world. For achieving this goal the U.S. and NATO military strategists envisage the conducting of decisive offensive operations from the first days of the war in order in a short period of time to defeat the opposing groupings of Warsaw Pact armed forces and capture their territory.

In endeavoring to conceal the aggressive goals of the North Atlantic Alliance in a war, the mass information media in the West constantly bring up the "Soviet military threat." In order to reinforce this myth, in conducting the major exercises of the bloc's JAF, the corresponding initial operational-strategic plan is worked out and in accord with this they conduct defensive actions in the initial part of the war. By creating such a situation, the NATO Command also pursues another goal: to teach the staffs and the troops to conduct operations under difficult conditions, when the enemy has the jump on them in deployment.

In assessing the influence of new weapons on the nature of combat operations, foreign military theoreticians agree that they increase the fire power and mobility of the troops and make it possible for them to carry out the missions in a shorter time even without employing nuclear weapons. At the same time, they propose the high stress of such actions and the increased consumption of materiel and make higher demands for maintaining continuous cooperation between the armed services and branches of troops as well as the organizing of their support. It is felt that the arming of the armed forces with new weapons systems, more advanced combat equipment and in the long run with reconnaissance-attack complexes can alter the nature of combat operations.

The American Command has worked out new methods for conducting combat operations reflected in the concept of an "air-ground operation (engagement)" and this is also being imposed in NATO. Thus, the "Rogers Plan" (named after the supreme commander-in-chief of the bloc's JAF in Europe) which created a stir in the West contains the same concepts as the American version. The main one is to ensure the ability of the JAF to conduct highly maneuverable offensive actions and make fire strikes against the second echelons of the enemy's operational field forces and approaching reserves.

Although the concept of an "air-ground operation (engagement)" has not been officially adopted in NATO, its individual provisions, judging from announcements in the Western press, are already being taken up by the bloc's troops. In particular, in the course of the numerous JAF exercises, particular attention is given to working out the methods of conducting highly maneuverable offensive actions by the ground forces in cooperation with tactical aviation, to disorganizing the moving up and thwarting the commitment of the enemy second echelons to the engagement. There has also been a trend to increase the amount of flying time by tactical aviation for carrying out tasks to seal off the combat area with a reduction in the number of aircraft sorties allocated for close air support for the ground troops.

The NATO Command feels that at present the basic provisions of the "Rogers Plan" can be only partially realized, and that they will be introduced gradually during the 1980's into the combat and operational training practices of the bloc's JAF, that is, as new weapons are delivered. However, even now the NATO specialists are endeavoring to employ them in the course of the operational and combat training of the troops and naval forces.

The ground forces, as is stressed in the foreign press, are capable, together with the air forces and navies, of carrying out the set missions employing both nuclear weapons and conventional means of destruction. In possessing long-range weapons systems and mobile field forces, they are capable of rapidly establishing superiority over the enemy on selected sectors on the offensive and promptly regrouping the resources for repelling the enemy strikes on the defensive. From the experience of maneuvers such as "Autumn Forge" and certain other exercises, their participation in combat operations in the theater of war is envisaged in the form of offensive and defensive operations by the field forces (groups of armies, field armies and equivalent field forces of the tactical commands in the areas) with air force and naval support.

Offensive operations are viewed in NATO as a type of combat operations for the field forces ensuring the achieving of the strategic goal of defeating the enemy armed forces and establishing control over its territory. An offensive is not only the basic type of combat operations but also one of the main principles of waging war. In accord with it the following measures should be carried out: anticipating the enemy in making massed strikes with nuclear and conventional weapons as well as in maneuvering the troops; a continuous effect to the entire depth of the enemy grouping's operational configuration in the aim of disrupting its control and thwarting the plans to employ the second echelons; concentrating superior resources on crucial sectors in the shortest periods of time; close cooperation among the forces participating in the operation.

From the materials of the foreign military press it follows that the first operations by the field forces of ground troops are planned and prepared for ahead of time in those sectors where they are based in peacetime. For achieving the aim of an offensive operation in the Central European Theater of War, each army group can carry out two offensive operations (the first and the following ones).

The setting off for the destination and troop deployment area, from the experience of the exercises of the NATO JAF, starts 3 or 4 days prior to the start of combat operations. The army groups in the Central European Theater of War are ordinarily deployed in zones from 200 to 400 km with a single-echelon operational configuration and the assigning of a strong reserve. The army corps which are being deployed in the sector of the main thrust are assigned zones 40-80 km wide with the divisions up to 30 km.

The basic methods of advance, in the views of the NATO Command, are offensives without a pause and with planned preparations. The first is envisaged against hurriedly prepared enemy defenses, particularly for the capturing of intermediate lines in the operational depth, and the latter in the aim of breaking through a prepared defense.

In the course of an operation, three forms of maneuver can be carried out: a frontal offensive (against hurriedly prepared defenses and with the making of nuclear strikes), a breakthrough (in the absence of exposed flanks and intervals in the prepared defenses) and an envelopment (or the variety of it, an outflanking) as well as combinations of these.

Before the going over of the troops to the offensive employing conventional weapons, preparatory fire for the attack is planned. In accord with the new requirements, in the course of it the artillery, fire support helicopters and tactical aviation should attack the troops not only in the first echelon but also the second, the reserves and other installations in depth, the knocking out of which will lead to disrupting the coordinated functioning of all elements of the enemy's operational configuration.

For ensuring a high rate of advance, it is recommended that combat operations be conducted with a maximum effort by the forces during the day and at night, making wide use of tactical and operational airborne forces, particularly in the crossing of water obstacles and the capturing of intermediate defensive lines without a halt, and the causing of fire damage to enemy reserves moving up from the rear.

It is assumed that the reserves of the army groups and army corps will be committed to battle after the carrying out of the immediate task, chiefly for exploiting success and achieving a high rate of advance as well as the enveloping and encircling of the enemy. For this reason, they are given the mission of advancing rapidly without engaging the enemy forces remaining on the flanks. The destruction of centers of resistance in the rear is part of the mission of units assigned to the reserve of the army group after they have carried out their missions.

The rate of advance for formations employing conventional weapons, according to the experience of recent exercises, in breaking through the tactical defensive zone is 10-15 km a day and in the operational depth 40 km and more.

The conducting of defensive operations is basically permitted for protecting the men and equipment, for gaining time as well as in the aim of forcing the enemy to concentrate its troops so that they are more vulnerable. The NATO strategists also do not include the intentional conducting of the defensive by ground forces until air supremacy is won and the balance of forces is altered in favor of the bloc by the making of massed fire strikes employing conventional, chemical and nuclear weapons against the troops in the first and subsequent echelons of the enemy's operational configuration.

In accord with the new demands of the U.S. and NATO command, the aim of the defensive is not only the holding of ground but also the defeating of the advancing enemy. The foreign press has emphasized that the differences between defensive and offensive operations for large troop groupings will consist not so much in the nature of the actions as in the goals set. The defensive of the formations and field forces should include defensive and offensive actions, that is, become more active. Purely defensive actions will be conducted basically by units and subunits.

The main content of a defensive operation will be strikes deep against the enemy's operational configuration (according to the Western terminology the "deep defeat" of the enemy), counterattacks and counterstrikes.

Depending upon the set mission and the conditions in the operational situation, two types of defensive are recognized: mobile and positional. The situational conditions, as is emphasized in the foreign press, can require the organizing of a mixed defense.

The operational configuration of the army groups with the intentional going over to the defensive in the Central European Theater of War, according to the experience of exercises, is initially set in a single echelon with the assigning of a reserve of one or two divisions, but after going over to the defense a second echelon can be organized from the reserves as part of the army group of the formations.

In the zones of operations of the army groups, positions are built for the cover troops, the general security and battle outposts, as well as one forward and one or two intermediate defensive lines. The overall depth of the operational configuration, as is emphasized in the foreign press, will depend primarily upon the physicogeographical features in the area.

A defensive operation, in the views of foreign military specialists, can be conducted only by conventional weapons and chemical weapons, but the staffs should always have detailed operational plans for the use of nuclear weapons which would be employed upon instructions from a superior command and considering the situation (for example, with the threat of the breakthrough of the forward defensive line).

The "deep defeat" of the enemy employing both conventional and nuclear weapons should be carried out continuously (with the start of the moving out of the enemy troops from the jump-off areas to the completion of the operation) and with increasing intensity as the enemy's forward units approach the cover area and the forward edge of the forward defensive line.

The NATO Command in a defensive operation gives particular importance to the destruction of enemy tanks and other armored combat vehicles. For this reason, in accord with the "Rogers Plan" the primary task is the arming of all the services of the bloc's JAF with antitank weapons: both long-range (air canisters with antitank mines, multiple launch rocket systems, helicopters with Hellfire class antitank guided missiles) as well as short-range (helicopters with the TOW antitank guided missile, tanks, antitank missile complexes, manual grenade launchers and field artillery).

The destruction of enemy assault groupings in the cover zone and those who have breached the forward defensive line should be carried out by conducting counterattacks and counterstrikes which would be made against the flank of the grouping which has forced its way in before it can be reinforced by reserves from in depth. For sealing off the reserves it is proposed that the "deep fire damage" be increased, that the basic airborne groupings be dropped in the rear, that mixed minefields be laid remotely and so forth.

Consequently, as the foreign press emphasizes, the ultimate aim of the defensive is to create conditions for carrying out offensive operations.

The air forces of the NATO countries, in the estimate of the bloc's command, will play an important role in operations on the European theaters of war. The methods of their employment are determined by the NATO "air doctrine" adopted in 1976 as an official guide for the joint air forces.

In accord with this doctrine, one of the basic forms of conducting combat operations for tactical aviation is air operations (offensive, defensive, for tactical reconnaissance, for ferrying troops and cargo and combat air support) in the course of which the air forces can carry out the following missions: the winning and holding of nuclear and air supremacy, the providing of close air support for the ground forces and navies, the sealing off of the combat area, the covering of troops and rear installations against air strikes, the conducting of air reconnaissance, the dropping of airborne forces and the shifting of troops and cargo.

The bloc's command has given basic attention to offensive actions, that is, to those which are planned ahead of time and carried out by making strikes (employing conventional or nuclear ammunition) against important targets as well as by conducting air combat. In particular, in the course of an offensive air operation conducted in the initial period of a war, all the basic tasks of tactical aviation are to be carried out. Here the combating of enemy aviation and the making of strikes against its strategic reserves and important military-economic installations will be carried out by the air forces basically independently while the providing of close air support for the ground forces and the sealing off of the combat area will be carried out within the "air-ground operation (engagement)."

According to the views of the NATO command, air force operations in carrying out all the tasks entrusted to this service should be more carefully coordinated than before with the tasks carried out by the field forces and formations of the ground forces and navies in the theater of war.

Air supremacy will be achieved by massed strikes against control posts, base airfields and enemy ground air defenses as well as by destroying its combat aircraft in the air. As foreign specialists feel, the success of all other operations will depend upon the successful execution of this task.

The air forces provide close air support for the ground troops and naval forces following coordinated plans (usually up to 40 percent of the tactical air sorties are given over to this in exercises). From the experience of exercises, from 150 to 280 aircraft sorties per day are assigned for a U.S. army corps. Requests from the ground forces for close air support in exercises have usually been carried out within 40-90 minutes. However, the command of the U.S. Armed Forces feels that in line with the high speed of combat, the response time should be minimized and be 15-45 minutes.

Judging from recent statements in the foreign press, the sealing off of combat areas for the air forces is to become the basic means of the enemy's "deep defeat." It is felt that the importance of this task will grow as the troops are supplied with new weapons.

The goal of sealing off the combat area is to prevent or limit the maneuvering of enemy troops, interdict the prompt engagement of its reserves in combat and the delivery of supplies to the troops. For this, as foreign military specialists feel, during individual periods up to 50 percent of the aircraft sorties will be assigned to this. Involved in making the attacks are the fighter bombers (F-111), light bombers (Bucaneers), multipurpose tactical fighters (F-4, Tornado, Jaguar, F-16 and Mirage-5), naval aviation and in individual instances strategic bombers, too. Certain specialists have also proposed employing cruise missiles.

The basic objectives of air strikes for sealing off the combat area usually are the nuclear missiles in the jump-off areas and at firing positions, troops in assembly areas and on the march, road junctions, bridges, crossings, airfields, command posts, dumps and supply depots, and in actions in a maritime sector, naval bases and ports. For hitting stationary objectives they plan to make preplanned attacks immediately against several targets (a massed strike), and against mobile ones strikes by tactical fighter groups from a ground alert status after receiving the reconnaissance data. At night, time separated attacks by groups and individual planes are considered most advisable.

The decision to make a strike is usually taken by the commander of the NATO JAF in the theater of war or by the army group commander. On the basis of this the commander of the air forces formations in the theater of war (the JTAC commander) determines the number of tactical fighters. For coordinating the actions of the field forces of the various armed services in a joint operation, the appropriate coordination control bodies are set up. For example, for organizing coordination between the ground forces and tactical aviation, according to the experience of exercises, a joint actions operation center is established on the level "army group--JTAC" and an air support operations center for the "field army (army corps)--air army (TAC)." Tactical air control teams are sent out to divisions (brigades).

Naval forces. The most important missions of the NATO navies in the initial period of a war, both all-out nuclear as well as limited, are to ensure the strategic movements of troops and cargo from the United States and Canada to Europe over the lines of communciations and provide support to the groupings of the bloc's JAF in operations in the European theaters of war. The basic conditions for carrying out these are felt to be the creation of a good situation in the Eastern Atlantic and the Mediterranean Basin for the operations of naval assault forces and preventing the deployment of enemy ships in the Atlantic. In an all-out nuclear war the prime task of the navies is to make nuclear strikes against major enemy installations.

As has been shown by the experience of the major exercises of the NATO navies, all these tasks are to be carried out integrally: in an all-out nuclear war by massed nuclear strikes against major strategic objectives, fleet forces, naval bases and airfields for shore-based aviation and in a limited conventional war, the successive carrying out (in collaboration with the joint NATO air forces) of operations to win supremacy at sea in the various maritime theaters of war and supremacy in the air.

Under the conditions of the European Theater of War, such operations will be carried out in the Norwegian and North Seas and in the Mediterranean Basin. In addition to the navies these will involve a portion of the tactical air forces of the NATO air forces. Here foreign specialists feel that it can be a question of winning supremacy at sea in limited areas and for a certain interval of time.

The winning of such supremacy is to be achieved by destroying submarines and surface vessels at sea and in bases as well as closing the straits zones. For locating and tracking enemy submarines and for destroying them they will employ previously deployed stationary long-range sonar detection systems, shore-based patrol aviation, helicopters, submarines and ASW ships, and for combating ship groupings, they will employ antimissile boats, submarines, missile boats and carrier-launched aviation. The length of an operation, from the experience of operations, is 3-5 days.

In the course of operations to win supremacy at sea in certain areas of the maritime theaters of war, the NATO navies can also carry out blockade actions for the purpose of preventing the deployment of enemy ships in strategically important areas of the Atlantic.

After the winning of supremacy at sea and the superiority in the air, the basic efforts of the navies are to be focused on supporting the combat operations of the bloc's ground forces, primarily on the northern flank, in the zone of the Baltic Straits, in the maritime sectors of the Central European Theater of War and in the Mediterranean Basin. In the views of the NATO military theoreticians, this can include air and ship fire support for the ground forces and the delivery of supplies to them, the interdicting of enemy sea movements and amphibious landing operations (air support for ground forces in the "Teamwork-80" Exercise was provided by carrier-launched aircraft from multipurpose carriers and U.S. marine aviation shifted to Norwegian airfields during the "threatened period").

The NATO command considers the conducting of amphibious landing operations to be one of the most important forms of naval participation in offensive operations in the European theaters of war. In peacetime, these questions have been worked on in all major exercises ("Teamwork," "Dawn Patrol," "Display Determination" and others).

Thus, with the increased combat capabilities of the NATO JAF, coalition military strategy in the bloc is becoming evermore aggressive. Along with preparing to conduct an all-out nuclear war, this envisages the creation of a material basis to conduct a limited war in Europe against the Warsaw Pact countries with the U.S. strategic offensive forces not being employed in this.

The aggressive plans of the U.S. and NATO military-political leadership are also revealed in the working out of the method for conducting combat actions employing conventional weapons. This envisages the simultaneous defeat of all the opposing groupings of the Warsaw Pact Armed Forces to the entire depth of the European theaters of war.

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EMPLOYMENT OF WEST GERMAN TANK BRIGADE IN DEFENSE DISCUSSED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 29-33

[Article by Candidate of Military Sciences, Docent, Col A. Yegorov: "The Bundeswehr Tank Brigade on the Defensive"]

[Text] The Bundeswehr Command, in following the adventuristic course of the United States and NATO in preparing for an aggressive war against the USSR and other socialist states, has continued to increase the combat might of all the armed services. It feels that success in modern combat and an operation can be achieved chiefly by the broad employment of tank formations and units capable of operating successfully in various types of combat and making most effective use of the results of nuclear strikes.

In viewing the tank troops as the main assault force of the ground forces, the West German military specialists plan to employ them not only on the offensive but also in conducting the defensive for defeating primarily the enemy tank groupings.

As has been stated in the foreign military press, the defensive is an imposed type of combat which is conducted in the aim of checking the enemy offense, causing it maximum losses and creating favorable conditions for going over to the offensive. Moreover, it is emphasized that defensive actions can be conducted in order to gain time and free a portion of the men and weapons for employing them on the most important sectors. The going over to the defensive can be carried out intentionally or by compulsion depending upon the existing situation, that is, ahead of time (in the absence of contact with the enemy) or under the conditions of its continuous fire effect.

In the course of combat training, the formations and units are prepared for the skillful conducting of two types of defense--mobile and positional. The basis of the former is the broad maneuvering of the troops combined with strikes from depth and its task is to create advantageous conditions for going over to the offensive. The second is designed to hold on to an important region or line in the aim of causing maximum losses to the enemy and repelling an offensive by its superior forces in order to create favorable conditions for going over to the offensive. It has been emphasized that the choice of one or another type of defensive depends upon the overall concept of the operation, the effective strength and possible nature of enemy actions, one's available resources, the terrain features as well as other conditions.

According to data in the Western press, a tank brigade of today includes two tank brigades and one mixed tank brigade, one motorized rifle battalion, an artillery battalion, a tank killing company, and combat and rear support subunits. It has 110 tanks of the "Leopard" type, around 50 Marder infantry combat vehicles, around 40 M-113 armored personnel carriers, 18 155-mm M-109G self-propelled howitzers, 12 Jaguar-2 self-propelled launchers with Tow ATGM [antitank guided missile] and 36 Milan ATGM launchers.

Bundeswehr military specialists feel that in a mobile defense a tank brigade will operate chiefly in the second echelon of a division in the aim of making counterattacks along with other units in the flank of the enemy which has driven into the defenses. However, its tank battalions can also be employed for wiping out enemy tanks which have broken in from previously prepared firing positions. In the second echelon it is assigned an assembly area which is 20-40 km away from the forward defensive edge. It is considered advisable to deploy the battalions here over an area of at least 25 km^2, keeping the companies in company columns which are spread out, using the camouflage and protective properties of the terrain and remaining ready to move up to the lines for making counterattacks.

The Bundeswehr command views the carrying out of counterattacks as one of the crucial stages in defensive combat. Their aim is to destroy the enemy which has driven into the defenses and to create favorable conditions for going over to the offensive. In this context great attention is given to the correct choice of the axis of the counterattacks, the surprise of carrying them out, to organizing close cooperation between the counterattacking units and the units conducting defensive combat as well as to ensuring fire and air softening up.

As the West German military specialists have pointed out, with the driving of the advancing side into a preplanned area, a tank brigade in a dispersed formation is to move up to the deployment lines for the counterattacks. If the enemy has succeeded in crossing the blocking position without a halt, it is recommended that the tank brigade repel its actions by firing from the designated line. But when the enemy has been halted in the blocking position, nuclear strikes are to be made against the enemy (in conducting combat employing nuclear weapons) in addition to air and artillery strikes; after this the tank brigade counterattacks in the flank and rear of the enemy units which have driven in. Here it is recommended that the nuclear strikes be made 20-30 minutes prior to the counterattack while the brigade should counterattack along a front of 10-12 km, keeping a battle formation of a single echelon. The tank brigade's subunits in developing the counterattack operate with the methods and procedures inherent to an offensive without a halt.

In a positional defense, a tank brigade can most often be in the division's second echelon and carry out tasks to tie down the enemy's main forces breaking through the forward edge of the defenses, in causing the enemy maximum losses, in preventing the development of the offensive toward one of the division's flanks, in addition to carrying out counterattacks in the aim of recovering the lost position. In the first echelon it can carry out the tasks of repelling the enemy offensive, causing losses to enemy personnel and equipment, as well as hold an occupied area (piece of ground). In certain instances, in the

absence of contact with the enemy, the brigade's subunits can be sent into the support area and incorporated in the combat (holding) detachments which after carrying out the combat mission are pulled back behind the forward edge into the brigade's defensive area.

The Western military press has pointed out that the chief content of actions on the defensive is the combating of tanks and other armored vehicles. For this reason, particular importance is paid to ensuring a high density of antitank weapons, to echeloning the antitank fire plan, to the early equipping of firing lines for the antitank weapons and tanks, to choosing and preparing the "jump off" areas for antitank helicopters and so forth.

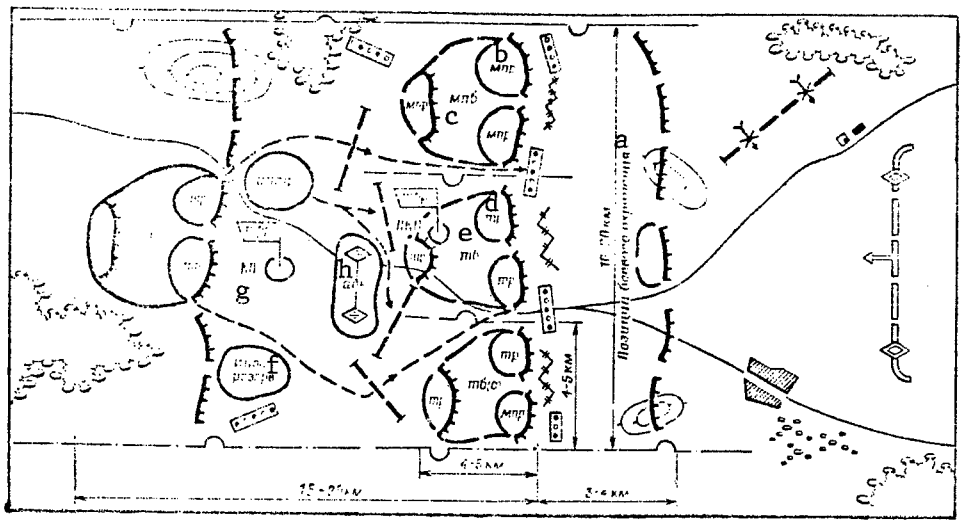
As the experience of the conducted exercises shows, on the defensive in the first echelon of a division, a tank brigade is usually given a defensive area of 10-20 km along the front and 15-30 km in depth. It is felt that without fail here they should consider the terrain, the natural obstacles, the protective conditions against enemy observation and fire, as well as the possibility of conducting effective antitank fire and using the antitank helicopters. Considering the obtained mission, the terrain conditions and the available time, battalion defensive areas are prepared (4-5 km along the front and in depth) and within them company ones (1.5-2 km) with these being based on the platoon strongpoints adapted for all-round defense. In the absence of direct contact with the enemy, at a distance of 3-4 km behind the forward defensive edge, the battle outpost positions are set up with a motorized infantry or tank company being assigned to these from the brigade's second echelon (see the diagram). These subunits should be reinforced with antitank weapons and in conducting defensive actions be supported by artillery and tank fire. At night and under conditions of limited visibility, observation posts and terrain illuminating posts are sent forward 300-400 m ahead of the battle outposts and patrolling is organized between the strongpoints. The battle outpost positions are covered by antitank mixed minefields. Close security is sent out from the first echelon companies a distance of up to 500 m from the forward edge.

One of the basic principles which is followed by the Bundeswehr Command is the preventing of any routine in the configuration, organization and methods of conducting the defensive by the tank brigade. One thing remains fixed: the focusing of efforts on the sector of the assumed offensive by the main enemy tank grouping as well as the obligatory hitting of its tanks, armored personnel carriers and infantry combat vehicles not only in front of the forward edge but also great distances at a certain moment and in the necessary area.

The West German regulations and manuals have pointed out that the brigade's battle formation on the defensive depends upon its strength and reinforcements, the actually existing situation, the received mission, the probable nature of enemy actions and the terrain conditions. It is felt that the battle formation should correspond to the chosen method of defeating the advancing enemy and ensure the successful carrying out of the set tasks.

The battle formation of a tank brigade can be formed up in one or more often in two echelons. In any variation it is recommended that the motorized infantry and mixed tank battalions be employed in the first echelon and only in individual instances can they be part of the second echelon or the reserve.

A single-echelon configuration with the creation of a reserve (up to a reinforced tank company) is recommended when it is little probable that the enemy will advance in this sector with its main forces or when the terrain ahead of the forward defensive edge is impassable for the enemy armored combat vehicles, or it is known that the men and weapons of the advancing forces are insignificant. In the given instance a brigade can defend an area of terrain more than 20 km wide along the front.



Battle Formation of a Bundeswehr Tank Brigade on the Defensive (Variation)

Key: a--Positions of battle outposts; b--Motorized infantry company; c--Motorized infantry battalion; d--Tank company; e--Tank battalion; f--Engineer reserve; g--Command post; h--Artillery battalion.

A two-echelon battle formation is considered the basic one with two or three battalions in the first and one or two (as a rule, tank ones) in the second.

The foreign military specialists have pointed out that the success of the defense depends largely upon how fully the combat capabilities of the brigade's TOE subunits are realized. Thus, a motorized infantry battalion fighting in the first echelon of the brigade forms a battle formation usually of two echelons. For increasing the stability of antitank defenses, it, in fighting on the main sector, will be reinforced by a tank company (13 tanks), a platoon of self-propelled Jaguar-2 launchers (up to 4 launchers), a battery of 155-mm self-propelled howitzers (6 guns) which with its TOE antitank weapons are concentrated on the likely tank approaches and echeloned in depth. The launchers of the Milan and Hot ATGM should be positioned in close proximity to the forward edge in such a manner that they can hit the enemy tanks at the distant approaches to it. According to the estimates of specialists, their density per kilometer of the battalion's defensive front can be six-eight units.

The mixed tank battalion forms up its battle formation also in two echelons: the motorized infantry and tank companies in the first and a tank company in the second. Its antitank defenses are organized according to the same principle as a motorized infantry battalion and the defensive area is usually selected in terrain favorable for firing, for sheltering and moving one's own subunits and at the same time impeding the movement of enemy tanks. The firing of the tanks combined with the fire of the artillery and motorized infantry comprise the basis of the fire plan.

The tank battalion in the brigade's first echelon can take up the defensive in the sector of the enemy's main thrust or on a secondary one. It is recommended that it be reinforced with motorized infantry, particularly under nighttime conditions. In the first instance, it organizes its battle formation in two echelons: two tank companies in the first and one company in the second. Tanks are the basis of the defenses and their density on the front can be eight vehicles per kilometer. Its effectiveness, in the opinion of the Bundeswehr Command, is ensured primarily by the firing of all the battalion's weapons which is prepared for in accord with a plan and closely controlled as well as by maneuvering the subunits in the course of defensive combat. Main and alternate positions are dug for the tanks and these are built in such a manner that they cannot be detected by the enemy. Ahead of the forward defensive edge they create a zone of solid multilayered fire to a depth of 600 m.

According to information in the West German press, the second echelon of the brigade (a tank battalion) is deployed 10-15 km from the forward edge. Its purpose is to conduct counterattacks in the aim of defeating the enemy which has driven into the defenses, restoring the lost position, repelling subsequent attacks and creating conditions for an offensive.

The military press has pointed out that the antitank defensive system of a first echelon tank brigade, in addition to the antitank missile complexes, the grenade launchers and tanks of the battalions, includes an antitank reserve created from the tank killing company of the brigade, the supporting antitank helicopters as well as the antitank obstacles and mixed minefields which are built in front of the forward edge, in the intervals between the battalion defensive areas, on the flanks and deep in the brigade's defenses.

For the tank killer company which includes three platoons each with four self-propelled Jaguar-2 launchers, routes of advance and firing lines (at least two) are prepared on the likely tank approaches in the aim of promptly destroying the enemy tanks and infantry combat vehicles which break through deep into the defenses. The firing positions of the self-propelled launchers on the firing lines are selected considering the protective and camouflaging properties of the terrain, the possibilities of effective firing at maximum range, maneuverability and concealment from enemy surveillance. The main principles in employing the tank killing company, judging from information in the foreign press, are surprise of employment and massed fire against the armored targets.

The artillery battalion of 155-mm howitzers is positioned behind the battle formations of the first echelon battalions a distance of 4-6 km from the forward edge in an area 3-4 km along the front and 2-3 km in depth. The basic artillery missions are the following: the causing of maximum losses to the

enemy in the aim of thwarting its preparations for an offensive, support for the tanks in their moving up to the attack line, the neutralizing of enemy artillery, close support for the defending subunits, and fire support for the counterattacks of the second echelon.

Defensive combat, in the absence of direct contact with the enemy, starts in the forward defensive area by the combat detachments of the division and then by the subunits of the brigade's battle outposts. Their actions, as a rule, are supported by the fire of field artillery from alternate positions, the ATGM launchers and by helicopter strikes, with the basic efforts of the weapons being concentrated on the destruction of tanks and other armored combat vehicles. For this there are the plans to use the Lars MLRS [Multiple Launch Rocket System] which can carry out remote mine laying, 120-mm mortars with the Bussard antitank mines, 155-mm howitzers, the BO-105P antitank helicopters and the ATGM launchers of the subunits conducting defensive combat in the forward defensive zone.

As the West German military specialists feel, the offensive against the defending subunits of the brigade usually starts with the enemy's softening up fire. During this time their personnel takes shelter, leaving the duty weapons and observers in position. With the shifting of the enemy artillery fire into depth, the subunits leave their shelters and take up their positions ready to repel the offensive by the tanks and infantry by firing all the weapons.

From information in the foreign military press, the tanks, armored personnel carriers and infantry combat vehicles are to be repelled as they approach the brigade's forward defensive edge. With the approach of the enemy armored combat vehicles to a distance of 3-4 km from the forward edge, fire is opened up against them by the Hot ATGM from temporary firing positions located directly at the forward edge. At a distance of 2,000-2,500 m, the armored targets of the advancing side are to be destroyed with tank fire. For hitting the tanks at a range up to 2,000 m, Milan ATGM are to be employed and when they reach a line 300-700 m away, the antitank grenade launchers also join battle.

With the approach of the enemy directly to the forward edge, the first echelon battalions of the brigade endeavor to check the attack by all forces and means, to cause maximum losses to the enemy, to hold the forward edge and not to prevent a breach. The repelling of the attack and the holding on to the defensive areas of these battalions are considered the most intense and crucial moments in defensive combat.

In the event that the first echelon subunits of a tank brigade cannot repel the attack and the enemy has succeeded in breaching the defenses, the brigade commander concentrates the fire of all weapons on the enemy and in accord with the developing situation organizes a counterattack by the brigade's second echelon for recovering the initial position. The counterattack is carried out, as a rule, in the flank of the enemy grouping which has driven in, when there is a threat of breaking into the defensive areas of the first echelon battalions, however the forces of the brigade's first echelon are still able to control the situation.

The pullback of the brigade's subunits is permitted only upon an order from the command.

These, judging from the views of the West German military specialists, are the basic principles in organizing and conducting defensive actions by a Bundeswehr tank brigade.

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U.S. SEPARATE ANTITANK HELICOPTER BRIGADE EXAMINED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 33-35

[Article by Col S. Semenov: "The U.S. Separate Antitank Helicopter Brigade"]

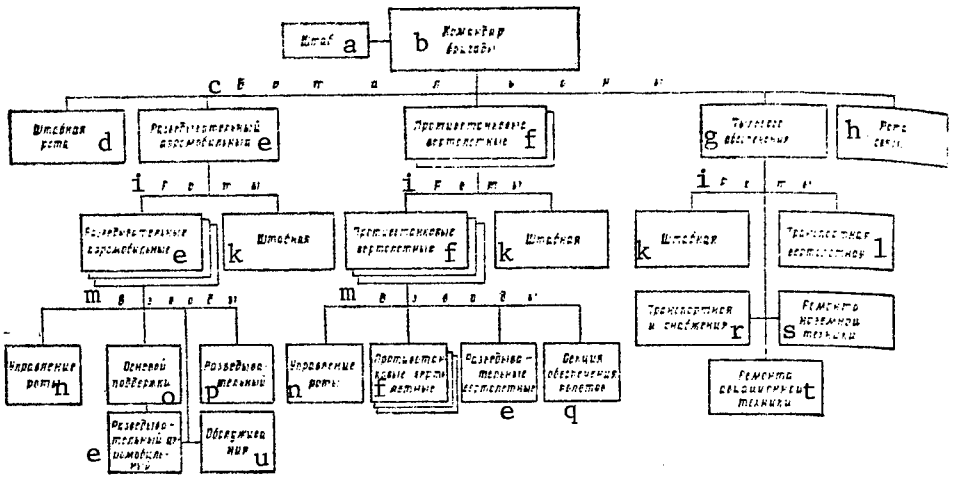
[Text] The U.S. military-political leadership, having set out to achieve military supremacy over the Soviet Union, is giving great importance to increasing the combat capabilities of the general purpose forces, in particular, the most numerous component of them, the ground forces. Here significant efforts have been made at increasing the antitank capabilities of the formations and units by saturating them with modern antitank weapons, primarily helicopters armed with antitank guided missiles (ATGM).

At present, judging from the data in the foreign military press, in the ground forces there is one antitank helicopter brigade (this is under the command of the U.S. Ground Forces in the continental U.S.) as well as a large number of separate army aviation groups, battalions and companies equipped with various types of helicopters, including antitank.

This brigade (with the number 6 and stationed at Fort Hood, Texas) was organized in February 1974 on the basis of a number of separate helicopter and aeromobile units and subunits of the ground forces. Here they test out and develop the procedures and methods for the combat employment of primarily helicopter gunships and reconnaissance helicopters in all-arms combat.

In organizational terms, the brigade includes a headquarters and headquarters company, a signals company and four battalions: one reconnaissance aeromobile, two antitank helicopter (at present, one with career officers) and one rear support (see the diagram). It has more than 2,750 personnel (according to the TOE 3,930 men) and 224 helicopters (336), including 90 antitank and 70 reconnaissance.

The headquarters company (over 70 men) is designed to provide combat, rear service and administrative control over the brigade's subunits by the commander and staff. It has also been given the task of general security and billeting and equipment in the disposition, the collecting of weather data, the receiving and assigning of personnel, their medical services and financial support. This company has nine helicopters (reconnaissance and general purpose).



The Organization of the U.S. Separate Antitank Helicopter Brigade

Key: a--Staff; b--Brigade commander; c--Battalions; d--Headquarters company; e--Reconnaissance aeromobile; f--Antitank helicopter; g--Rear support; h--Signals company; i--Companies; k--Headquarters; l--Transport helicopter; m--Platoons; n--Company headquarters; o--Fire support; p--Reconnaissance; q--Flight support section; r--Transport and supply; s--Repair of ground equipment; t--Repair of aviation equipment; u--Maintenance.

The signals company (around 100 men) organizes and maintains dependable multichannel radio communications in the SW and USW bands between the staff and the subunits of the brigade, the brigade command, the superior staff and cooperating all-arms units and subunits; it is also responsible for carrying out measures related to covert control and the encoding of the communications channels. The company's specialists provide the necessary aid to the brigade's subunits in organizing communications and in their maintaining and use of the equipment. The company is equipped with radios of the SW and USW bands for telephone and teletype communications, equipment for connecting the wire and wireless lines, telephone switchboards, radio relay equipment, encoded teletype communications and a single communications center, and terminals for the multichannel lines.

The reconnaissance aeromobile battalion (over 800 men) with the main tasks of reconnoitering the enemy and the terrain in the brigade's interests consists of one headquarters and three reconnaissance aeromobile companies. In it are more than 85 different helicopters including 27 fire support, 9 of which are armed with the Tow ATGM. The basic combat subunit of the battalion is a reconnaissance aeromobile company which is represented by the company headquarters and four platoons: reconnaissance, reconnaissance aeromobile, fire support and maintenance. It is armed with nine fire support AH-1S Cobra-Tow helicopters, eight general purpose UH-1 Iroquois helicopters and nine OH-58 Cajova reconnaissance helicopters.

The antitank helicopter battalion (800 men) is designed primarily for hitting enemy tanks and other armored equipment as well as for providing general fire

support for the ground units and subunits. It includes a headquarters company and three antitank companies each of which includes a headquarters, a flight support section and four helicopter platoons: three antitank and one reconnaissance. In a company are around 200 men, 21 AH-1S Cobra Tow antitank helicopters, 12 OH-58 Cajova reconnaissance helicopters and 13 UH-1 general purpose helicopters. As a total the battalion has 112 helicopters: 63 antitank, 36 reconnaissance and 13 general purpose.

The rear support battalion includes five companies: headquarters, transport helicopter, transport and supply, ground equipment repair and air equipment repair. It has over 1,000 men of approximately 160 different military specialties. The battalion is armed with 18 helicopters, including 16 CH-47 Chinook transport helicopters (in the transport helicopter company) and 2 general purpose helicopters (in the air equipment repair company). The transport helicopters can simultaneously lift and air-ferry around 140 tons of various freight over a distance of more than 100 km. The battalion's subunits are capable of servicing, carrying out minor repairs and supplying fuels and lubricants to the brigade's TOE equipment numbering 640 different planes and units, as well as evacuate this from the battlefields.

In the views of the ground forces command, the separate antitank helicopter brigade can be employed in all types of all-arms combat. Being a powerful and highly mobile means of fire, primarily antitank, in the hands of the all-arms commander, it is employed, as a rule, in full strength (in a single sortie, in the estimate of American military specialists, it is capable of hitting up to 600 tanks). This brigade can be kept in the reserve of the commander of the U.S. Ground Forces in the theater of war, it can be assigned to an army corps or in individual instances to the commander of a division which is fighting on the main sector. The employment of its subunits is not excluded for reinforcing divisions (brigades, separate armored cavalry regiments and even battalion tactical groups) fighting under specific conditions (on very rugged or swampy terrain, with a clearly expressed focal configuration of the enemy defenses and so forth).

The smallest subunit which can provide close support for the ground forces is an antitank helicopter company. Western experts put among the general principles for the brigade's combat employment the following: it at full strength fights against a tank (mechanized) division and an antitank helicopter battalion against a company and the antitank helicopter company against a battalion.

The most characteristic task entrusted to the brigade's subunits in all types of combat operations is fire damage to the main enemy grouping, particularly its armored and mechanized troops, in the brigade's combat zone. On the offensive the brigade is employed, as a rule, for exploiting the success of the troops and for making fire strikes in pursuit of the retreating enemy and on the defensive for hitting the basic troop grouping, in conducting counterattacks or counterstrikes as well as for defeating the enemy which has broken through. In addition the brigade can operate as part of the cover troops in the forward defensive area and together with the ground units carry out the tasks of checking the advance of the advancing enemy and causing it maximum losses before it approaches the forward edge of the basic defensive area.

The brigade or its subunits are to carry out combat operations, as a rule, as part of the all-arms groupings and are directly subordinate to the all-arms commander in whose interests they are fighting. In exceptional instances, when the all-arms commander has lost control over his subordinate troops, the brigade commander can assume control and command over the troops fighting in the given sector independently or upon orders from above until control is restored. Under specific situational conditions the brigade is capable of carrying out combat missions with its own forces.

The American Command feels that the tasks of general combat and rear support for the brigade will be entrusted to the commander of the all-arms formation for whom the brigade is fighting. Moreover, in carrying out combat missions, the brigade should be supported by field artillery, tactical aviation and also be supported by air defense and ECM weapons in its positions, on the routes of advance and in the combat zone.

According to the data of the American press, at present, in accord with the reorganization which commenced in 1981 for the ground forces formations under the Army-90 Program, initially in the infantry divisions and later in the mechanized and armored ones, they intend to form an army air brigade in each. This brigade would include two antitank helicopter battalions, one general support helicopter battalion and one reconnaissance battalion. As a total the brigade would have over 2,000 men and around 150 different-type helicopters, including at least 50 antitank each of which would be equipped with 16 Hellfire ATGM. American military specialists have pointed out that the separate antitank helicopter brigade which exists in the ground forces will remain in them as a reserve for the chief command (the U.S. Ground Forces Command in the theater of war). At present, the brigade has already been assigned for possible use as part of the Rapid Deployment Forces designed to conduct combat operations in various regions of the world. Judging from the statements in the foreign press, its employment in the European theaters of war is not to be excluded.

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U.S. TRI-SERVICE TACTICAL COMMUNICATIONS PROGRAM OUTLINED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 36-41

[Article by Candidate of Military Sciences, Engr-Col V. Chistyakov: "'TRI-TAC' --A Program for Developing Communications Equipment in the United States"]

[Text] As has been pointed out in the foreign press, TRI-TAC (Tri-Service Tactical Communications Program) is an American integrated program for developing equipment during the period of transition from analog communications systems to fully digital ones. According to the plans of the developers, this should provide effective communications for the command, cooperation among the U.S. Armed Services in conducting joint operations, work with the joint Pentagon communications system as well as the connectible to the tactical and strategic communications systems of the armed forces in the other NATO countries, in particular, with the NATO Joint Automated Communications System NICS. Here it is proposed that the equipment be standardized on all levels of command on the basis of the extensive use of unified methods for the processing, distribution and transmission of information and the modular design of equipment. All the Armed Services and the National Security Agency are involved in financing the given program.

The composition, necessary amount and specifications for the new equipment were worked out in developing the plans of INTACS (Integrated Tactical Communication System) which was completed in 1976. Judging from the information in the foreign press, chief attention has been given to achieving the greatest efficiency, survivability and concealment of work, to the flexibility, mobility and compatibility of the various elements in the control system. Within the designated project, they planned to develop several-score types of different equipment.

American specialists have established that a maximum control efficiency is achieved in the instance that within the communications system there is a base network of trunk multichannel lines with switching centers to which, using connecting lines, it is possible to connect the communications centers of the control bodies and the mobile subscribers. Here it was not advisable to deploy multichannel communications equipment on levels below the army corps as this, in their opinion, reduces the mobility of the divisions. Instead of this, in the divisions they have decided to employ fundamentally new equipment of switchable VHF/UHF radio communications which can provide coded telephone

and telecode communications on the move with the possibility of the automated access to the base network of the army corps (army group in a theater of war) for each subscriber.

Switching centers are the chief elements in the future communications system and these determine its efficiency, handling capacity and mobility. Two basic types of switchboards have been developed: channel and message. Large integrated circuits combined with multilayered printed boards have been widely used in their design and due to this the equipment has rather high technical specifications with relatively small sizes and weight.

The AN/TTC-39 channel switchboard (Fig. 1) [not reproduced] is designed for serving (in elements of control from the army corps and above) networks of encoded telephone, facsimile (phototelegraph) and document communications as well as for transmitting data and images considering five priority categories in channel availability. Here the following types of services are provided: automatic scanning and connecting of subscribers in accord with the numbers assigned to them, the direct connecting of mobile subscribers with the keeping of a permanent number, conference calls for 20 groups of subscribers and circular calls for 30, automatic reconnecting of a broken connection over an alternate channel and the sending of call signals, the providing of direct communications channels for the most important subscribers as well as accelerated connecting of certain subscribers under a quick dialing program.

The switchboard serves subscribers with analog and digital communications and for this its units are made employing two base switching modules--analog with 120 lines (it employs a matrix with spatial line separation) and a digital one for 150 lines (with time separation). Both types of modules are controlled by the same central processor and as a consequence of this a hybrid switching unit is formed capable of handling all the existing types of analog and digital communications equipment. A range of a varying number of base modules makes it possible to create modifications of the switchboards for 300, 600, 1,200 and 2,400 lines. A switchboard for 300 lines can be installed in a standard S-280 container transportable by a 2.5-ton motor vehicle, one for 600 lines can be carried in two containers, one of which is used for control and the other as an equipment area. When it is necessary to handle the switching of a large number of lines, sets are made up which include several installations of the AN/TTC-39 equipment.

For use in elements below an army corps as well as for serving the communications systems in the subunits of the U.S. Marine Corps, medium capacity (AN/TTC-42) and small capacity switchboards (SB-3865 and SB-3614) have been developed. The former has much in common with the AN/TTC-39 equipment: it also is carried in a S-280 container and offers the same types of services for 150 subscribers. The latter are portable and do not have built-in scramblers. These are designed to serve up to 30 subscribers and when made up with two or three sets can provide switching for 60-90 lines. The foreign press has pointed out that all the designated channel switchboards are compatible with the previously developed field switchboards, the AUTOVON system switchboards, the switching units for the communications systems of the NATO Armed Forces as well as the commercial devices of the civilian telephone networks.

The AN/TYC-39 message switchboard is used for receiving, processing, storing and subsequently transmitting discrete information with compatible work of different terminals on control levels from an army corps and higher. As the latter it is possible to employ different data transmission equipment and other digital communications devices which transmit information at a speed from 45 to 16,000 bits per second over 50 autonomous digital communications lines or over a broad-band line with a capacity of 35 channels. It can be connected to the message switchboard directly as local subscribers or through the channel switchboard which is connected to the AN/TYC-39 equipment.

For providing compatible work of different terminals, special equipment has been developed for connecting and transforming the signals (a digital adapter) and this provides the matching of information in terms of transmission rate, signal level, the coding method and format. The AN/TYC-39 switchboard can handle up to 50 subscribers simultaneously considering six priority categories and eight levels of scrambling. The time for completing the request depends upon the subscriber's priority and the time of the data storage in the memories. The processed messages of the three higher priority categories and having a storage time of up to 24 hours can be given out to the requester in less than 7 minutes after the request. The remaining information which comes into the memory during the day is put out after 15 minutes and that with a storage time of greater than 24 hours is received not before 30 minutes. Such conditions are provided by four types of memories: on-line (on discs) and permanent with small, medium and large capacity (on magnetic tapes). The on-line handling of the messages is carried out by a L3050 processor with magnetic core memories designed for 131,000 words.

For monitoring the operation of the switchboard, a control board, a magnetic tape storage and line printers are employed. The equipment is housed in two standard containers: one for communications and the other for data processing. The first contains the converter units, the equipment for connecting the digital terminal equipment, a distributing frame, the channel switchboard, communications processor, teletypes and power supply units. The second contains the processor for the automated processing of messages, two external storages with random access, eight tape drives, three control panels with displays, three high-speed printers and power supply units.

For work on control levels below an army corps, mobile (AN/TYC-11) and portable (AN/GYC-7) message switchboards have been developed with a capacity, respectively, of 24 and 12 lines. The first model housed in a S-280 container and analogous to the AN/TYC-39 has similar performance but is smaller in size and weight. The portable AN/GYC-7 switchboard differs from the first two types in the fact that it does not have special memories and as a result it cannot store information with the subsequent putting out of it upon request. This switchboard operates on a real time scale and serves subscribers in the inferior tactical elements.

Transceiving equipment for the main multichannel lines provides communications between the switching centers and connects them with the communications centers of command posts. This equipment, in particular, will include digital tropospheric stations of the AN/TRC-170 type (it underwent testing at the beginning of the 1980's and initially around 100 units are to be purchased) of three

classes: heavy (AN/TRC-170V1), medium (AN/TRC-170V2) and light (AN/TRC-170V3, Fig. 2 [not reproduced]). The range of communications for one interval is, respectively, 320, 240 and 160 km. They are being manufactured in truck and container versions. The equipment operates in a frequency band of 4,400-5,000 megahertz and transmits information in a digital form over 8, 16, 32, 48 or 64 channels.

Each station, in addition to a transceiver, has a set of multiplexing equipment, low frequency equipment and two antennas, as well as digital signal adapters which provide optimum conditions in operating under conditions of both tropospheric scattering and a space wave. In the opinion of foreign specialists, this possesses increased resistance to jamming in comparison with the existing models. As part of a communications system in a theater of war, one AN/TRC-170 station can operate in a terminal mode for connecting the communications center of the command post to the switching center of the base network while two sets can provide a relay mode.

For interconnecting the various elements of the communications centers and for eliminating the need to lay a large number of connecting cables, a special short-range multichannel communications unit has been developed and a characteristic feature of this is compactness and rather high capacity. This includes the AN/TRC-138 army central radio relay set (46 or 98 channels) and the AN/TRC-175 semiset developed on the basis of the AN/GRC-199 aviation equipment. With the aid of the latter the information from the command post (communication center) is transmitted to the AN/TRC-138 (this consists of three AN/GRC-144 housed in a standard S-280 container) and which distributes the information between several main and connecting lines of the multichannel communications system.

For long distance communications, the system should widely employ satellite communications stations which will operate during the period of the setting up of the base network and on the move. At present, two types of modems (converters) are being developed and these provide for the connecting of the ground lines with the satellite communications lines. The first is designed to connect the AN/TTC-39 switchboards with all the satellite communications stations functioning in the centimeter wave band. This makes it possible to provide multichannel scrambled telephone communications or high-speed data transmission on levels from a division and above. The second type is used for linking up with satellite communications stations operating in the decimeter wave band and provides single-channel encoded telephone communications or low-speed data transmission. One such model is the AN/PSC-1 portable set (Fig. 3) [not reproduced] which is basically used in the subunits of special-purpose troops. Subsequently, in the aim of protection against ECM the equipment should include satellite communications sets (operating in the millimeter wave band) with program-controlled pencil-beam antennas which will impede radio reconnaissance and the intercepting of signals.

The subscriber equipment includes telephone, telegraph and facsimile digital communications devices with and without call scrambling. Thus, the DSVT digital telephone (with scrambling) has a built-in TSEC/KY-68 encoder equipped with a keyboard dialer and adapted for operating in a duplex mode over a four-wire system. This provides telephone communications and the transmitting of telecode

messages at a rate of 45-32,000 bits per second both through a switchboard and directly. For scrambling the calls with a direct link the device has its own gamma (random pulse) generator and provides a manual input of the key (synchronization). A delta modulator is employed for converting analog messages into a digital form.

The TA-954 device for scrambled digital telephone communications in terms of design and operating principle is analogous to the previous device and differs from it only in the absence of a built-in encoder. However, this can operate with the telephone scrambling equipment via a switching center which has the corresponding scrambling device.

A field digital telephone or ANDVT (Advanced Narrow-Band Digital Voice Terminal) is being developed for use in the low-level command elements and for transmitting digital information over narrow-band channels. This provides scrambled telephone communications and data transmission at a rate from 300 to 2,400 bits per second. The conversion of analog information into digital and the scrambling of calls are provided by a built-in vocoder, an encoder and a gamma generator. The device is designed for operation over radio channels and can be carried in motor vehicles, armored vehicles, helicopters, airplanes and ships. For this reason, it also has a built-in adapter for high-frequency noise suppression and for reducing the acoustical noise inherent to moving objects.

For transmitting telegraph messages within the TRI-TAC Program, modular digital facsimile communications devices have been developed and, as the foreign experts feel, these possess a number of advantages in comparison with conventional teletypes. Due to the built-in processor, these provide for the collection, processing, scrambling, transmission, receiving, unscrambling and distribution of documents between subscribers. The modular design of the devices makes it possible to employ them both as individual subscriber units as well as facsimile communications centers in transmitting large volumes of information.

A new area for the development of subscriber equipment is the introduction of digital facsimile devices in all control levels down to the battalion, inclusively. In the opinion of American specialists, this should increase efficiency and ensure facsimile communications. In particular, for transmitting graphic messages in a scrambled form, Litton Industries has developed the AN/UXC-4 digital phototelegraph device (Fig. 4) [not reproduced] in which the documents to be transmitted are transformed into electric signals using a scanning-beam laser while the compression of the digital information and its processing are carried out by using a large integrated circuit processor. These signals are received over standard telephone channels at a rate of 1.2-32 kilobits per second. Here an image 20 x 28 cm in size (a typed page) can be transmitted in 25 seconds. The device possesses high resolution (four or eight lines per millimeter) and a broad range of gray tone gradations (up to 16). This will permit the transmitting not only of graphics and text messages but also maps and photographs. In addition it will be possible to itentify the signature of officials.

Equipment for the access of mobile subscribers provides communications on the move. Using this equipment the commanders of units and subunits while in their command or staff vehicles can be connected to the base network. There are

plans to employ two types of equipment: radio-wire communications sets (in 1983-1995) and a range of equipment for switchable VHF/UHF radio communications (after 1995). The sets will include four VHF/UHF transceivers with antennas, a scrambling device and a switchboard as well as connecting equipment and remote control for connecting to the automatic telephone exchange of the communications center or switching center. At present, there are semi-automatic radio-wire sets which connect the subscribers with the involvement of an operator, however the disconnecting of the line is done automatically when the subscriber on the main network hangs up. These include the ordinary VHF/UHF radios with the TSEC/KY-90 scrambler attachments. During the 1985-1995 period, automatic radio-wire sets will be delivered and these are based on equipment developed under the SINCGARS-V* Program providing scrambled communications secure against ECM.

The set of equipment of switchable VHF/UHF radio communications is the result of further development of the principle of providing mobile subscribers with communications. This will become the basic means for controlling the troops of a division and providing encoded telephone and facsimile communications both at a halt and on the move. In combining the advantages of a wire telephone network (a large number of served subscribers, their rapid connecting in various combinations and secrecy of the calls) and radio communications (ease of deployment and the possibility of communications on the move), the new equipment, in the opinion of foreign specialists, should increase the effectiveness of communications in a division. The set will consist of central stations (CS) which provide the switching and relaying of signals and terminal sets (TS) which serve the local telephone and mobile subscribers of the VHF/UHF radio communications. The band of their operating frequencies is 30-88 megahertz and the data transmission rate is 16 kilobits per second. Each CS can serve up to 50 subscribers and for this it would include four-six sets of transceiving equipment, a processor and an automatic switchboard for 30 local communications lines. In addition, certain stations will be equipped with several VHF/UHF radio sets developed under the SINCGARS-V Program for connecting with subscribers of the ordinary radio communications networks, the single-channel satellite communications station (over long distances) as well as teletypes and digital phototelegraph equipment for immediate communications of the command. With the available equipment or through special radio access stations (doubled terminal sets) the CS can be connected to the nearby communications centers or switching centers, thereby connecting the mobile subscribers to the base network.

Each terminal set is equipped with a special transceiver, as well as digital phototelegraph and telephone sets. The equipment of the sets makes it possible for them to maintain direct communication between themselves over a distance of up to 10 km, and in employing several CS up to 45 km. In a division they plan to employ 6 CS, 60 radio access sets and up to 270 TS located on various mobile objects or adapted for use as portable equipment.

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* For more detail on this equipment see: ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 10, 1979, pp 41-42.--Editors.

Control and technical monitoring equipment is designed for directing the development, actual use and operation of all the system's equipment as a whole as well as for technical supervision over the state of the communications equipment where it is employed. The foreign press has pointed out that this is divided into four basic elements which are cosubordinate and territorially positioned in such a manner as to better carry out control functions. The chief element is the systems planning center (SPC) which provides long-range planning and overall direction over the work of the entire communications system in the theater of war. It works out demands for the further development of the system, it assesses and allocates existing resources, it determines its structure and interface principles with other systems, and works out guidance documents which are sent to the system control center (SCC) for implementation.

The SCC provides direct daily leadership over the work of the system and its basic subsystems considering the changing situation. Its most important task is to search for alternate routes for moving the information around communications centers and switching centers which have been destroyed or neutralized by ECM. The SCC provides the display and automated processing of data needed by the chief of communications for working out the optimum variation for organizing the system. The SCC directs the communications centers operation control centers (CCOCC).

The CCOCC is set up at each communications center and switching center where it provides accounting, control and supervision over the use of communications resources. Combined with the local switchboard, this center provides an optimum method of connecting the subscribers to the existing transceivers. An important task for it is also the organizing of the interaction of the analog and digital communications, their grouping and connecting with the scrambling equipment.

Working in close cooperation with the CCOCC are the equipment technical monitoring stations which are combined with the basic types of communications equipment and continuously provide the given center with information on its technical state. Such technical monitoring stations are found, in particular, at the AN/TTC-39 switching centers and near the AN/TRC-170 tropospheric stations.

Channeling equipment is designed for the grouping of the subscriber communications lines on various levels when it is necessary to connect them to transceivers, switchboards or technical monitoring stations. In accord with the TRI-TAC Program, digital multiplexers, modems and regenerator-amplifiers are being developed as the channeling equipment. There are digital devices for the three basic types of multiplexing (subscriber, group and line) connected in tandem to one another. These are being designed both in portable (with a capacity of several channels) and transportable models (up to 1,144 channels) each of which is designed to transmit digital information at a rate of 16 or 32 kilobits per second.

The subscriber multiplexing devices are divided into remote and central. The former are installed in the inferior-level control elements at a distance up to 150 m from the subscribers and bring together four subscriber channels into one group with time separation (a speed of 72 or 144 kilobits per second). The

group signals are then sent to the remote multiplexing combiner which serves as an intermediate element on the route to the group multiplexing equipment and provides a secondary grouping of the channels (with a capacity of 8-16) with an overall pulse rate of 288-576 kilobits per second. The central subscriber multiplexing devices are designed in the same manner as the remote ones and they form 8 or 16 local subscribers of the communications center into a group signal traveling at a rate of 288 or 576 kilobits per second.

The group multiplexing device is among the superior class of time-division multiplex equipment which brings together four-eight groups with a total capacity of up to 132 channels (a signal rate of 144-4,608 kilobits per second) and from the output of this the resulting signal goes to an amplifier for transmission over a small-channel cable line.

The line multiplex device operates in an asynchronous mode and forms the groups of channels coming in from the outputs of the previous devices into a single supergroup (1,144 communications channels) and transmitting the signals at a rate of 9.36-18.72 megabits per second. The supergroup is prepared for transmission over a multichannel cable or large-capacity radio relay line. The interfacing of the various groups of multiplex equipment both between themselves and with other elements of the communications system on the line and at the communications centers is carried out by using modems and regenerator-amplifiers.

The modems convert the signals received from the various subscriber sets and reduce them to a common form suitable for transmission over standard channels of cable or radio relay lines.

The regenerator amplifiers amplify and restore the signal form when the signals are transmitted over the CX-11230 coaxial cable presently adopted as an element of wire communications on the operational-tactical level. Depending upon the capacity of the cable lines, the relay amplifiers are set from 800 to 3,000 m apart. In the future, the coaxial cables are to be replaced by fiber optical lines with the appropriate equipment. There are also plans to employ VHF/UHF radio lines for connecting the elements of the small-capacity channeling equipment.

As has been pointed out in the foreign press, in the aim of ensuring continuous troop control in the transitional period and for the most efficient use of the existing equipment in introducing new facilities, the deployment of the future American communications system is to be carried out in three stages within the TRI-TAC Program. In the first (up to 1982), they should complete the deployment of the hybrid (analog-digital) system operating with the use of standard analog and newly developed analog-digital switchboards, digital multiplex devices and devices for scrambling telecode communications and the stations for the technical monitoring of the work of the communications centers. In the second stage encompassing the period of 1982-1992 they propose to further develop the hybrid system which will be characterized by the still-broader introduction of digital devices, in particular, line scrambling, subscriber and transceiving equipment, including digital satellite communications terminals. After 1992, the digital communications system based on the new equipment should be fully deployed in the theater of war.

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BATTLE FORMATIONS OF TACTICAL FIGHTERS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 43-46

[Article by Candidate of Military Sciences, Col V. Dolbnya: "Battle Formations of Tactical Fighters"]

[Text] In the first part of the article* we took up the views of military specialists in the United States and other capitalist countries which are members of the aggressive NATO bloc on the role of tactical fighter formations, their types and forms. We also gave examples of the configuration of a pair and flight of aircraft in various stages of the flight in attacking ground targets and in air combat. Below, using data published in the foreign press, we will examine analogous questions in terms of a larger group of airplanes.

As has been pointed out by the Western military experts, the formation of tactical fighters in a majority of instances consists of different-purpose groups carrying out their missions according to a single plan both with visual and radar contact with one another as well as without it. The formation's parameters between the groups are set in a rectangular system of coordinates relative to the leader and are maintained visually or with the aid of onboard and ground electronic equipment. The composition of each group, its purpose and formation depend upon the role performed by it.

The foreign press has emphasized that a squadron's formation includes attack forces (groups) and support forces (groups) the number, composition and purpose of which are determined chiefly by the nature of the combat mission and the situational conditions. Here the foreign specialists proceed from two requirements: ensuring the penetration of the attack planes to the objects of the strike; organizing tactical cooperation between all the groups and flight safety. The first is achieved by the rational allocation of the forces by purpose and by the configuration of the formation. The basis for fulfilling the second demand is correct consideration of the technical capabilities of the onboard electronic systems, the characteristics of tactical fighter weapons and the training level of the fighter crews.

In considering the above-given as well as certain other factors, the NATO military experts have reduced the tactical fighter formations to two basic varieties

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* See: ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 9, 1983, pp 41-46.--Editors.

determined by the particular features of employing the weapons of the attack groups against ground or air targets, that is, in attacking ground targets or in conducting air combat against enemy airplanes.

Battle formations in operations against ground targets consist, as a rule, of the attack group and the support forces.

The attack group is designed to attack the basic ground target. As was shown by the experience of the aggression of the United States in Vietnam and Israel in the Near East, in a raid on large areal objects (for example, an airfield) up to two-thirds of the aircraft were usually assigned to the attack group and one-third to the support group. However, when there was a shortage of tactical fighters, the groups operated against certain objects virtually without support planes and this, as the foreign press has pointed out, usually ended in failure. With the increased resistance of air defenses, the American and Israeli commands were forced to assign up to 50 percent of the planes to the support forces.

According to the views of foreign specialists, under present-day conditions support for the attack planes is provided by neutralizing air defenses on the route of flight and in the target area, repelling enemy fighter attacks, sending out screens, sealing off airfields, by conducting diversionary actions, by the extensive use of ECM and so forth.

In line with this the support forces can include the following basic groups: airspace clearing, enemy air defense neutralization, cover and feint.

Fig. 1 shows a variation of a tactical fighter formation (prepared on the basis of data published in the foreign press).

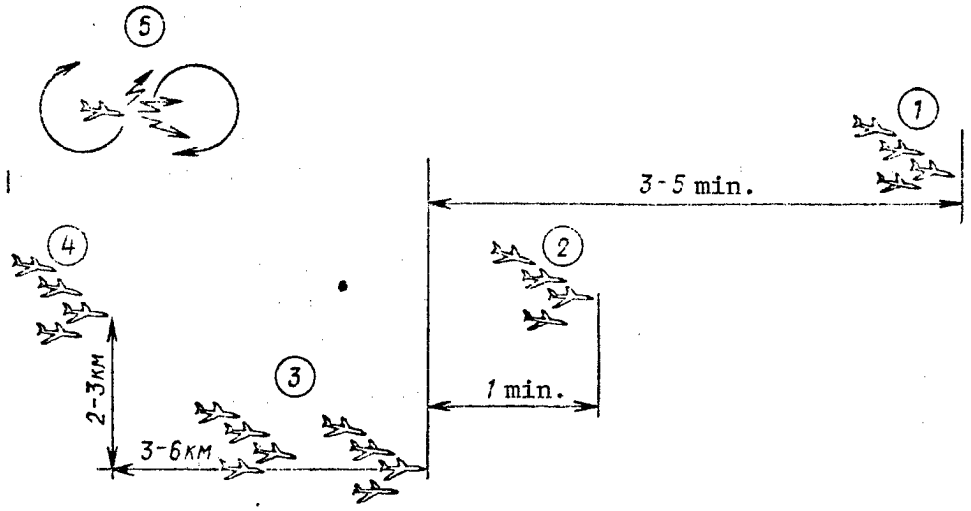

Fig. 1. Tactical Fighter Formation in Attacking Ground Objects (Variation)

1--Airspace clearing group; 2--Air defense neutralization group; 3--Attack group; 4--Cover group; 5--ECM plane.

The airspace clearing group travels ahead of the attack group (the time interval between them is 3-5 minutes). It enters the enemy fighter patrol zones and engages them in combat, thereby ensuring the overflight of the other planes in the squadron. Its formation can include a feint group the mission of which is to force a portion of the enemy crews to leave the patrol zones, thereby making it possible to create better conditions for their attack by the remaining fighters in the clearing group.

The air defense neutralization group flies slightly ahead (by 1 minute) of the attack group. It attacks the antiaircraft missile and artillery positions in the breakthrough area and in the target area.

The attack group, judging from the experience of the local wars and the air force exercises of the NATO countries, as a rule, flies in a flight column formation (in low altitude flights the distance between the flights does not exceed the range of visual visibility and averages 2-4 km) while the flights are in a V-formation. The group attacks the designated objects with individual planes, in pairs and more rarely in flights. The cover group is behind the attack group (at a distance of 3-6 km). It maintains its place in the formation relative to the attack group basically visually, remaining up to 2-3 km above during the flight.

The formation of tactical fighters operating against such small-sized targets as ground air defense weapons, control posts, radar stations and so forth can consist of three basic groups: fire reconnaissance, attack and cover.

The first (of two-four planes) at a high speed enters the antiaircraft missile zone and executes an antimissile maneuver. The second, flying at low or medium altitudes, attacks the enemy radar which has begun to operate, as a rule, employing homing antiradar missiles. After executing the maneuver, the tactical fighters in the fire reconnaissance group either increase the effort of the attack planes or support the cover group when necessary.

From the experience of exercises, the formations in different tactical groups are often made up to confuse the enemy. For this the parameters of the formation between the planes (pairs) are kept within the limits of enemy radar resolution for range and azimuth.

In carrying out missions to isolate a combat area, the tactical fighters operate as individual planes or in small groups as well as in a squadron or even a larger group (up to 80 planes).

Here the formation can consist of groups with the following purpose: attack, cover, ECM and target reconnaissance. In certain instances, it includes planes for target search and detection and for guiding the attack groups to the targets.

For supporting their actions, it is recommended that first the airspace be cleared and the air defense weapons along the route neutralized.

With close air support for the ground forces, aviation carries out three particular tasks: it reinforces the fire power of the ground forces, it provides them

with help in carrying out and developing a breakthrough and covers their battle formations against the air enemy.

Aviation carries out the first two by attacking designated ground targets. Depending upon the object of operations, the above-examined variations of squadron formations are employed. The U.S. and NATO command consider it advisable to use tactical fighters for this only after air supremacy has been won in the combat area.

In the course of supporting a tactical airborne operation, the fighters carry out the following particular missions: prior to the arrival of the force they "work over" the landing area, they "neutralize" the fire of the enemy ground air defenses and in the critical period after the landing of the force provide fire support for it. They operate in small groups (not more than a flight) in the same formations as in attacking ground targets.

Formations in operations against air targets. As has been pointed out in the foreign press, the tactical fighters can conduct air combat intentionally or by being forced into it in carrying out missions involving attacks on ground targets.

In the first instance, they are assigned for operations as fighters to cover the ground forces or the groups of attack planes and airspace clearing groups. Sometimes, as the experience of the combat of Israeli aviation in the Near East has shown, combat was organized specially for destroying the other side's fighters in the air. In covering the air troops or aviation, fighters conduct defensive-type air combat, as it is a response to the actions of enemy fighters. In clearing the air space and in organizing combat for the purpose of destroying enemy fighters in the air, they conduct active offensive operations.

In the second instance, the attack planes are forced to engage the enemy fighters and conduct defensive actions.

In the views of foreign military specialists, the battle formations of the tactical fighter subunits in anticipation of air combat should ensure their immediate going over to the attack after detecting the enemy, the individual aiming and launching of the missiles (firing) without interfering with one another, reciprocal covering against enemy attack for the different tactical groups and aircraft (pairs) in each group, avoidance of attack and continuous cooperation.

They feel that the largest group which can conduct combat at full strength is a tactical fighter flight. A line-abreast formation at medium or great altitudes and a V formation at low altitudes satisfy the above-indicated conditions in combat without radar control from the ground.

In offensive air battles the formation usually consists of two groups: the feint and the attack.

The feint group can be in front or behind of the attack group at a distance of constant radar or visual visibility remaining 2,000-6,000 m above. They fly in front if the attack planes have pulse radars and the enemy fighters can attack the feint group only from the rear. In this instance, the attack group with the

aid of the radars maintains its formation and searches for air targets. Having detected the enemy fighters coming in on the rear of the airplanes in the feint group, they make a surprise attack from below.

If the planes in the assault group are armed with pulse-Doppler radars with which it is possible to detect air targets against the background of the earth's surface and the enemy fighters can attack from the front, the feint group is positioned to the rear and above the attack group. This is done so that the enemy would first detect the feint group flying above, be distracted by it while the unnoticed attack planes would attack the enemy.

The foreign press has pointed out that the effectiveness of tactical air operations in combat is increased if the formation includes different types of fighters. Thus, the attack group should be made up of heavy planes which have powerful all-angle missile weapons while the cover groups should be made up of light maneuverable aircraft.

In covering ground forces, the tactical fighters first of all destroy the enemy attack planes and secondly the cover fighters, operating in close cooperation with the ground air defenses. In the given instance the formation consists of two basic groups: attack and cover. The allocation of forces between them depends upon the nature of the target (the number of enemy aircraft and their tactical purpose).

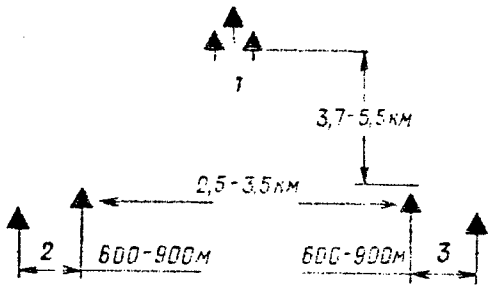

Fig. 2. Formation of tactical fighters (two flights) escorted by group of planes at commensurable speeds: 1--Group of escorted planes; 2--First fighter flight; 3--Second fighter flight.

Judging from the experience of exercises, the attack group consists of one or two flights while the cover group consists of from a pair to a flight.

As has been stated in the Western press, in escorting aircraft of different branches of aviation, the tactical fighter formation is made up of flights the mission of which is to support the crossing of those areas where they could be attacked by enemy fighters.

Fig. 2 shows the battle formation of a flight in escorting aircraft the speed of which is commensurable with the optimum speed of the escort fighters providing them with the necessary energy level for engaging in combat. In this instance they fly behind the escorted planes without maneuvering, remaining above when flying away from the sun or remaining below in flying toward the sun.

With a slower speed of the escorted planes, to prevent flying ahead the fighters remain over their formations, maneuvering in the horizontal plane (most often they employ such types of maneuver as a serpentine or a crisscross). In escorting slow-flying planes (helicopters), the fighters maneuver in pairs (a horizontal loop).

The above examined tactical fighter formations comprise, as foreign specialists feel, only a small part of those which are employed in the air forces of the capitalist states. However, they point out, as the airplanes and their systems become more complex, the formations will alter somewhat in order to more fully utilize the advantages of the new equipment. The effectiveness of the enemy air defense systems will influence their composition and parameters as before, but the fundamentals and principles of the configuration will remain virtually the same.

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U.S. AIR FORCE MAKING COMMUNICATIONS MORE RESISTANT TO JAMMING

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 47-50

[Article by Candidate of Technical Sciences, Engr-Maj A. Dashin: "Ways for Increasing Resistance to Jamming for Air Communications in the U.S. Air Force"]

[Text] Recently electronic combat* has had an ever-increasing influence on the methods of the combat employment of the armed forces. In the opinion of foreign specialists, the airwaves are becoming just as much an arena for conducting war as are the land, the sea and the airspace. By electronic combat one understands countermeasures employing equipment to generate interference, the employment of special weapons to destroy enemy radio electronic systems, deception and misinformation by employing electronic devices, and reconnaissance of radio electronic systems. All these measures are aimed both at weakening or destroying the enemy control, command and communications systems as well as protecting one's own.

In October 1980, at Kelly Air Base in Texas, a joint center for electronic warfare was established. This shows that the U.S. military leadership pays serious attention to the questions of electronic combat under present-day conditions. Judging from information in the foreign press, the center's basic mission is to work out programs and specific measures for countering the command, control and communications systems.

The center's activities encompass a broad range of problems. Thus, its specialists provide consultation and help on the questions of planning electronic warfare in the troops, they simulate the operation of electronic warfare weapons during exercises, they provide advice to the NATO countries on the questions of electronic warfare and draw up plans for retraining officers in electronic countermeasures. The center analyzes the radio electronic situation and assesses the resistance to jamming of various radio electronic devices and systems. In particular, it has been announced that in the relocating of the E-3A Sentry AWACS airplanes to Saudi Arabia, they tested the vulnerability of the communications and radar equipment carried on this aircraft. In addition, the center provides consultation for organizations concerned with the designing and testing of electronic combat equipment. The foreign press has pointed out

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* In the Western press this is sometimes termed electronic warfare.--Editors.

that at present here they are developing a model of a so-called tactical disruptor which is a computerized program simulating ECM [electronic countermeasures] conditions in any theater of military operations as well as an information retrieval system for displaying and assessing the electronic warfare resources.

Judging from materials in the foreign press, while previously basic attention was given to interrupting the work of the enemy's air defense command and communications system, at present they are studying the possibility of countering the entire command, control and communications system as a whole. This should deprive the enemy of the capacity to maneuver its forces, carry out supply, coordinate the sequence of combat missions and ultimately to successfully conduct combat operations.

A plan is also being worked out for electronic suppression (ES) and protection of the air and ground communications systems. As promising ES weapons, specialists from the mentioned center consider the following: one-time use jamming transmitters capable of remaining in the target area for an extended time; advanced ground jamming stations; equipment for creating powerful electromagnetic pulses which can knock out the solid-state components of radio electronic equipment; lasers which would knock out the antennas and power transmission lines; disinformation equipment and methods for data and voice information transmission systems.

The center's command is giving serious attention to the possibility of the enemy's employment of an analogous arsenal of ES devices and is working out the appropriate programs and measures for ensuring the protection of its own communications equipment and systems. The American experts assume that the most effective for defense against intentional jamming in communications systems is the use of broad-band signals, the jumping of the operating frequency following a certain law, adaptive systems for receiving and processing the radio signals, radio devices with an adjustable transmitting power and jamming-resistant codes with the detection and elimination of errors.

These methods were theoretically established even before the founding of the center. However, the development of digital signal processing devices using large and super-large integrated circuits and the employment of microprocessors and special equipment which includes instruments operating on surface acoustical waves and a charged bond makes it possible, in the opinion of foreign specialists to realize them by saturating the aircraft and ground command posts with jam-proof communications equipment.

It is felt that onboard communications equipment with a band of 225-400 megahertz and carried on the U.S. Air Force and Naval Aviation tactical fighters, with a band of 30-88 megahertz employed on the Army Aviation and a band of 2-30 megahertz which is being employed predominantly for heavy planes (for example, the E-3A of the AWACS system) and the strategic reconnaissance planes for providing long-range communications do not provide sufficient resistance to jamming under conditions of intentional jamming. For this reason, in 1975, they began to carry out a long-range program for ensuring voice air aviation communications "Seek Talk" under electronic combat conditions. In carrying out this program consideration was given to all the most recent scientific and technical achievements in the area of electronic countermeasures.

In the communications system, according to this program, they intend to employ broad-band signals combined with adaptive receiver antennas which form gaps in the radiation pattern toward the source of intentional interference. Such antennas will be employed on airplanes contact with which should occur under the conditions of increased resistance to jamming. The system's means of communications, according to the assertion of Western specialists, will provide successiveness in terms of the existing AM radios, they will be compatible with the corresponding scrambling equipment (also being developed under this program) and make it possible to counter future jamming-generating equipment.

It has been announced that since the full-scale initiating of work under the Seek Talk Program is to start in the mid-1980's, a short-term program called "Have Quick" is to be worked out for ensuring resistance to jamming for voice communications equipment between aircraft and the ground and between themselves. In accord with this program they are to modernize first of all the existing onboard and ground communications equipment (with amplitude modulation in a band of 225-400 megahertz) for realizing the method of intermittent tuning of the operating frequency (TOF). Frequency tuning can be done simultaneously for all users of the radio network or in a radio link in a fraction of a second following a certain law which is unknown to the enemy. Here the program for altering the operating frequency and carried out according to a pseudorandom law is entered in a special memory of each user. In addition to radios which have been modernized and specially adapted for operating under TOF conditions, the Have Quick system includes equipment of a synchronizing system.

As radio equipment for tactical aircraft, forward air spotters, ground mobile and stationary air traffic control posts and AWACS airplanes, they have proposed employing variously modernized radios (for example, the AN/ARC-164, AN/ARC-171, AN/GRC-171, AN/WSC-3 and others) and the RT-1319/URC transceiver which includes the AN/TRC-176, AN/PRC-113 and AN/VRC-83 radios.

Thus, the frequency synthesizer, a portion of the functional modules and the control panel have been modernized in the AN/ARC-164 which is presently the basic onboard radio of the Air Force tactical airplanes and has replaced a majority of the obsolete radios to ensure work in the Have Quick system. It is felt that the radios in the existing set with a single transceiver are suitable for work in this system. A separate attachment, the MC/10205/GRC, was developed for the standard AN/GRC-171 ground radio (with a power of 20 watts). This attachment is also suitable for the radio used in the U.S. Navy and makes it possible together with them to realize TOF conditions. According to information in the foreign press, for the AN/ARC-51 radio which is employed in the AN/MRC-107A and AN/MRC-108 stations, an adaptor has been developed which includes the O-1800/TRC timer and the 10-watt RT-1145A transceiver.

The foreign press has pointed out that all improvements on the designated equipment are being carried out so as to maximally reduce the dimensional and electric connection with the existing installed shock-absorber mounting and electric connections. All the equipment of the Have Quick system provides for autonomous power sources for maintaining constant operability in the event of brief power failures.

Increased attention is being paid to ensuring resistance to jamming for the communications of the E-3A AWACS airplanes. Here they plan to install several AN/ARC-171 radios with a wave band of 225-400 megahertz. These have a power of 30 watts in a voice mode with amplitude modulation and 100 watts with frequency modulation. The electric circuitry and layout of the radio have not been substantially altered in comparison with the existing model and for operating in a TOF mode, an additional I-2391 electronic unit has been developed consisting of an onboard rubidium time and frequency standard as well a control and display devices. The latter makes it possible to monitor the state of the timer and provides the operator with the possibility of controlling the radio under TOF conditions, for example, to program the frequency tuning, to select the radio network for operating and so forth.

The synchronizing equipment on facilities of the Have Quick system include an 0-1800/TRC precision frequency generator which is used for generating time as well as the SC-1191/TRC monitor signal generator. This can receive and send data on precise time over the standard radio and wire communications channels and is used for correcting the precision frequency generator. In addition, the SC-1191/TRC is capable of receiving information on the precise time from a portable atomic clock or the R-2171/TRC receiver from the Transit satellite navigation system of the U.S. Navy. In the latter instance, the radio signal from the satellite containing data on the precise time in frequencies of 150 or 400 megahertz is received by the AN/TRC-177 ground station consisting of a receiver and a SG-1192 control signal generator. Then this station relays the information on the time to the objects operating in the Have Quick system. Ordinarily the AN/TRC-177 is located at the basic operational bases or the ground control centers.

It has also been announced that in the aim of obtaining precise time for the operation of the AN/GRC-206 radio (this is to be used for communications between forward air spotters and planes) under TOF conditions, a rubidium timer has been developed which can also be operated with the AN/VRC-83 and AN/PRC-113 radios.

Thus, as has been pointed out in the foreign press, all the users of the Have Quick system have an opportunity to maintain precise time for the period required to carry out standard combat missions as well as to correct it, receiving the corresponding signals by radio or over wire channels from rubidium and atomic timers or from the Transit satellite system. Moreover, the radios of the Have Quick system can also operate under ordinary communications conditions and in one of 7,000 frequencies in the band of 225-400 megahertz. In the event of the threat of electronic suppression, the system is switched to a TOF mode. For realizing this mode, information of two types is used: WOD (World of Day) and TOD (Time of Day).

The first actually is a program tuning frequency which in a digital form is input into a special memory of each user of the system and this memory retains the information with a power outage. The inputting of the data can be carried out both during the preflight preparations as well as in the process of the flight. For example, in the modernized HQ-AN/ARC-164 radio, this operation is done manually from a control panel and the correctness of the input is monitored on a digital display. The frequency tuning program is kept over one or several days.

The TOD information is used for correcting time on board. Using radio signals modulated in accord with the time information, this is transmitted from the SG-1192/TRC signal generator or from other users of the Have Quick system which have precise time. Its receiving, for example, in the HQ-AN/ARC-164 radio is done automatically after turning on or manually at the operator's request by pressing a button on the control panel.

In the opinion of the U.S. Air Force Command, the Have Quick system will provide resistance to jamming for voice communications with the tactical air airplanes in employing modern electronic countermeasures equipment for a period necessary to work out and introduce the future Seek Talk system.

In the 30-88 megahertz band, the basic program aimed at improving the quality of communications is SINCGARS [Single-Channel Ground and Airborne Radio Subsystem]. This provides for the creation of single-channel ground and airborne radios which by the end of the 1980's should ensure jam-proof and scrambled communications between the tactical airplanes and the ground forces. Such radios will be compatible with the existing sets of this band having frequency modulation. Speech in them will be transmitted in a digital form at a rate of 16 kilobits per second and encoded using a special device employed in the communications system which is being developed under the TRI-TAC Program. It is felt that in this instance compatibility will be achieved with the tactical army data transmission systems at various speeds right up to 16 kilobits per second. The basic measures which reduce the vulnerability of the system to radio interception, radio reconnaissance and electronic suppression by the enemy should include operating frequency tuning and the possibility of adjusting the sending power of the transmitter. The employment of adaptive antennas with a controllable radiation pattern is also being investigated.

Judging from information in the foreign press, in the shortwave band there are no programs analogous to Have Quick and Seek Talk. It is felt that additional opportunities for jamming-proof airborne communications at the end of the 1980's will be achieved by using a joint tactical information distribution system or JTIDS operating in a band of 960-1,215 megahertz. Although it does possess limited opportunities for providing voice communications it does have very high jam-proof performance in exchanging digital data under ECM conditions.

Thus, in the opinion of American specialists, the development and implementation of the above-named programs should ensure jam-proof communications for the U.S. tactical airplanes between themselves and the ground control centers with the employment of present-day and future electronic suppression devices by the enemy.

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DATA GIVEN FOR A-37 GROUND ATTACK PLANE

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 54-55

[Article by Engr-Col (Res) I. Kutsev: "The A-37 Light Ground Attack Plane"]

[Text] In the 1960's, the United States initiated work to develop special types of military equipment and weapons for use by American troops in combating the peoples fighting for their freedom and independence as well as for delivery to the reactionary regimes in certain Latin American and Southeast Asian countries. One of the models of such equipment was the A-37 light ground attack plane designed for carrying out so-called counterinsurgency operations from the air. The airplane was designed and produced in two modifications: the A-37A and the A-37B.

The A-37A began to be received by the U.S. Air Force in 1966. A total of 39 planes were built. In August 1967, 25 planes were delivered to South Vietnam for assessing their combat capabilities in carrying out the following missions: close air support for the ground troops, escorting helicopters during landing operations, combat air patrolling in escorting convoys, conducting reconnaissance with the employment of weapons and the sealing off of a combat area under nighttime conditions. Over 4 months, the A-37A ground attack planes made around 5,000 combat sorties. Judging from information in the foreign press, the standard version of the aircraft's payload carried on eight underwing pylons included four 750-pound high-explosive bombs and four 500-pound bombs (with a total weight of more than 2,000 kg). With such a payload, the operating range of the ground attack plane in patrolling for 30 minutes was 185 km and in 5 minutes, 460 km. The maximum speed did not exceed 700 km per hour and the all-around probable error in bombing was around 15 m. After carrying out a mission, rather frequently the airplane returned to base with one engine shut down. It was felt that with the failure of one of the engines and a flight weight of not more than 5,300 kg the plane was capable of carrying out the mission.

Upon the statement of American specialists, in the course of the combat employment of the A-37A ground attack plane, such failings were discovered in it as the short patrolling time, difficulties in employing the weapons at a speed of 740 km per hour and insufficient armor against the weapons of ground troops.

The A-37B began to be received by the Air Force line units in May 1968. In developing this airplane, specialists from the Cessna firm tried to consider

the shortcomings detected in the previous model. It was announced, in particular, that the maximum take-off weight had been increased to 6,350 kg and the flying weight could be 6,500 kg with mid-air fueling. The strength specifications of the structural elements were improved (the maximum permissible g-load in maneuvering was 6). The service life of the air frame in terms of fatigue strength was to be brought up to 7,000 hours. The maneuvering performance and controllability at high speeds of flight with a maximum combat load were improved. The aircraft's cockpit was armored. The gun and cannon weapons were improved. Thus, in addition to the 7.62-mm 6-barrel Minigun machine gun located in the nose of the fuselage, under the outer wing it was possible to suspend two mountings with 30-mm Deva machine guns (the weight of each was 340 kg with a unit of fire of 250 cartridges) or two with 20-mm cannons (respectively, 249 kg and 300 rounds).

Up to September 1969, 366 A-37B planes were ordered. The first batch of these planes was delivered to South Vietnam in 1968, and subsequently their total number was raised to 224 units. Series output of the A-37B ground attack planes continued until 1975. A total of around 600 planes were built, including over 300 purchased by the U.S. Air Force.

In terms of external appearance, aerodynamics and design, the A-37A and A-37B aircraft are basically identical. The A-37B is considered more advanced (its characteristics are given below).

Weight, kg:	
Maximum take-off	6,350
Empty aircraft	2,820
Combat load	2,580
Maximum speed at altitude of 4,875 m, km/hour	816
Maximum cruising speed at altitude of 7,600 m, km/hour	790
Maximum rate of climb at ground level, m/sec	35.5
Service ceiling, m	12,700
Range of flight with maximum fuel supply at altitude of 7,600 m, km	1,630
Range with combat load of 1,860 kg, km	740
Length of take-off run, m	530
Length of landing run with maximum landing rate, m	1,260
Take-off distance to altitude of 15 m, m	790
Landing distance with maximum landing rate, m	2,000
Length of aircraft (with flying boom), m	8.93
Height, m	2.7
Wing span, m	10.93
Wing surface, m^2	17.09

The A-37B is a monoplane with a straight wing, a single-fin tail unit and a retractable tricycle landing gear (see the diagram [not reproduced]). The wing is two-spar and manufactured from an aluminum alloy (the skin along the trailing edge is made from a magnesium alloy). The wing is equipped with conventionally designed ailerons and slotted flaps. The fuselage is all-metal, of semimonocoque structure and in its lower portion behind the nose wheel is an air brake with an area of 1.14 x 0.3 m.

The tail is a cantilever-type and all metal. The fin is structurally part of the fuselage. The elevators and rudders have trimmers. The nose wheel is raised forward and the main wheels retract into wing wells. The pressure in the tires of the nose wheel is 2.6 kg per cm^2 and in the main tires 7.7 kg per cm^2.

The cockpit is designed for a two-man crew seated side by side. The left-hand seat is occupied by the pilot (captain) while the right-hand is designed for an observer (when necessary) or a trainee during training flights. The cockpit is supplied only with an air conditioning system without creating an overpressure.

The power unit consists of two J85-GE-17A turbojet engines with a maximum thrust of 1,290 kg each (on the A-37A plane there are two J85-GE-5 turbojet engines with a maximum thrust of 1,090 kg each). Fuel is carried in two wing tanks (with a capacity of 428 liters each), in two nonjetissonable tanks (360 liters) located at the ends of the wings and in the fuselage (344 liters). The total fuel supply is 1,920 liters. Under the wing it is possible to mount four droppable tanks with a capacity of 378 liters each.

The ground attack plane is equipped with a mid-air fueling system for the KC-135 tanker planes and the fueling boom is in the nose of the fuselage.

The hydraulic system (a pressure of 105.5 kg per cm^2) raises and lowers the wheels and operates the flaps and air brake. The compressed air system is an emergency one for raising and lowering the wheels (an operating pressure of 140 kg per cm^2). The electrical system includes two DC starter generators with a voltage of 28 volts and two nickel-cadmium batteries. A convertor (115 volts, 400 hertz) serves as the AC source. The radio electronic equipment includes an VHF/UHF radio, an interrogator of the TACAN system, a radio compass and an IFF transponder.

The aircraft's built-in weapons include one 7.62-mm 6-barrel Minigun machine gun (a unit of fire of 1,500 rounds, a rate of fire of 3,000 or 6,000 rounds per minute). The mounted weapons (bombs and cluster bombs of varying type weighing up to 750 pounds as well as the launchers with 70-mm unguided missiles) are mounted on eight underwing mountings (four under the outer wing). The calculated weight of the combat load on each of the two inner mountings is 394 kg, for the middle ones it is 272 kg each and on the outer ones 227 kg each. The weapons system also includes a reflector sight and two aerial camera guns.

The foreign press has pointed out that at present the A-37B ground attack planes, in addition to the U.S. Air Force, are in service in the air forces of Thailand, Guatemala, Honduras, the Dominican Republic, Colombia, Paraguay, Peru, Chile and certain other countries.

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PROSPECTS FOR ALTERNATE AIRCRAFT FUELS EXAMINED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 55-57

[Article by Candidate of Technical Sciences, Col Yu. Alekseyev: "Future Aviation Fuels"]

[Text] In the mid-1970's, judging from information in the foreign press, Western specialists encountered the need to develop an alternate aviation fuel to replace that produced from petroleum. What is the essence of this problem and why did it arise precisely during that period? The basic reason is felt to lie in the sharp increase in the rate of oil production by the sector producing this fuel. Thus, according to statistical data, oil output in the world was (in million tons) 95 in 1920, around 300 at the beginning of World War II, 523 in 1950, 1,052 in 1960, 2,336 in 1970 and 3,064.4 in 1980. As a whole, the oil reserves have been estimated at 90-100 billion tons. Moreover, it is the most valuable hydrocarbon raw material for the chemical industry and the reserves of this are not replenishable (at least mankind has not yet found a way to solve this problem).

In general power engineering, there has been a practical approach to the given problem with the production of electric power at nuclear and hydropower plants being expanded, research being conducted in the area of the use of MHD generators and so forth. In terms of aviation fuel the question is much more complex. At present, the specialists in the leading capitalist nations have proposed several short- and long-term methods for obtaining new aviation fuels to produce the fuel of petroleum origin.

In the not distant future there are plans to produce synthetic liquid hydrocarbon fuels (analogous in performance to petroleum-origin fuels) from coal, oil shale and even by synthesis. The foreign press has emphasized that research in this area in the capitalist countries has been underway for many years. In particular, the United States is developing high-energy, high-density fuels for various types of guided missile weapons, including cruise missiles.* The technology for producing hydrocarbon fuel from coal envisages the use of a solvent. From fuel shales it can be obtained by liquification

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* For more detail on the development of synthetic high-energy fuels, see: ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 11, 1980, pp 56-57.--Editors.

under the conditions of a limited air supply and refining of the formed condensate like ordinary petroleum. Synthesis involves the use of natural gas and oil products produced from coal (such a method, as the Western press has shown, has been used for several years now in South Africa).

Other variations are being studied for replacing petroleum-based aviation fuels considering the immediate future. Thus, they have proposed using methyl and ethyl alcohols (in a pure form or mixed with conventional fuels) as a reserve fuel for military aircraft with gas turbine engines. France and Brazil, in particular, are working in this area.

However, in the opinion of foreign specialists, the most promising types of aviation fuel over the long run are the cryogenic ones, that is, liquid hydrocarbon and methane. It is felt that in terms of cost of production, liquid methane is substantially cheaper than liquid hydrogen but is significantly inferior to it in terms of its burning heat by weight (11,900 and 28,500 kilocalories per kg, respectively) and has a poorer (even in comparison with conventional fuels) combustion stability while its use involves the solving virtually of the same difficult problems as in the event of employing liquid hydrogen. For this reason Western experts prefer the latter. In their opinion, liquid hydrogen is virtually an ideal aviation fuel due to its maximum energy capacity with the minimum weight of the amount of fuel required for flight.

The United States is conducting the most active research in the area of the possible use of liquid hydrogen as a future aviation fuel. For example, in the estimate of specialists at Lockheed, its use in a passenger aircraft will reduce the take-off weight by approximately 25 percent in comparison with a plane employing a conventional, synthetic hydrocarbon fuel or liquid methane (with equal performance of the planes in terms of range and payload). As specialists from this firm assert, a cargo transport plane will have even greater advantages. The cost and energy specifications of the proposed new aviation fuels as well as the calculated data for an air transport employing various fuels compiled from materials in the foreign press are given in the tables.

Table 1

Approximate Value for Obtaining Alternate Aviation Fuels
(in 1979 prices)

Fuel	Cost, $/gal *
Hydrogen from coal:	
Using nuclear power for liquification	1.80
Using hydrogen for liquification	2.29
Hydrogen from water (electrolysis) with liquification employing nuclear power	3.24
Synthetic hydrocarbon fuel:	
From coal obtained by technology employing a solvent	1.35
Based on synthesis using natural gas and petroleum products obtained from coal	0.98
From fuel shales	0.92

* 1 gal = 3.78 liters

Table 2

Specifications of Alternate Fuels

Specifications	Liquid Hydrogen	Liquid Methane	Jet A Fuel and Synthetic Hydrocarbon
Chemical formula (composition)	H_2	CH_4	$C_{12}H_{23}$ $C_{19}H_{51}$
Combustion heat:			
By weight, kilocalories/kg	28,500	11,900	10,250
By volume, kilocalories/m^3	2.2×10^6	5.05×10^6	8.45×10^6
Specific weight, kg/m^3	70.8	422	827
Boiling temperature at pressure of 1 atm, °C	-253	-161	171-267
Freezing temperature, °C	-259	-182	-50
Specific heat, kilocalories/kg/°C	2.31	0.835	0.47
Evaporation heat, kilocalories/kg	107	127	70.7

What other advantages (aside from energy ones) does liquid hydrogen possess? Thus, specialists at Lockheed feel that its greater heat capacity will provide the possibility of cooling the structure of a high-speed plane at great altitudes. It has been estimated, in particular, that cooling the skin will provide a laminar flow over the wing and reduce its resistance by approximately 40 percent. In their opinion such a method of controlling the boundary layer is more effective than mechanical procedures based upon the principle of suction.

Table 3

Performance of Air Transport Designed for 400 Passengers Using Various Fuels

Specifications	Mid-Range Aircraft (5,560 km)			Long-Range Aircraft (10,200 km)		
	H_2	CH_4	Jet A	H_2	CH_4	Jet A
Weight, tons:						
Take-off	143.3	168.8	167.1	167.1	221.6	223.3
Empty aircraft	90.3	95.4	87.7	101.7	112.6	101.9
Fuel	10.9	27.8	32.7	21.6	58.9	69.7
Wing surface, m^2	280	300	285	288	336	352
Length of fuselage, m	64	61	60	65.7	61.4	60
Performance (in flight at cruising speed)	17.1	18.2	18.5	17.2	18.7	19
Number of engines	4	4	4	4	4	4
Engine thrust, kg	12,000	13,000	13,300	12,700	16,500	16,600

As has been pointed out in the foreign press, in order to use liquid hydrogen as an aviation fuel, it is essential to solve several problems since none of the developed aircraft can presently employ a cryogenic fuel. In line with this the question arises of whether it is possible to convert aircraft with conventional hydrocarbon fuel to a cryogenic one? Western specialists feel that such a way to solve the problem is not advisable as it entails an unacceptable loss of available volume on the airplane. In particular, the insulated tanks required for a cryogenic fuel can be carried only in the fuselage, as there is little room for them in the wing. In this instance the effective fuselage volume is sharply reduced and the converted aircraft is virtually unfit for both the military and civilian versions.

For this reason the only rational path is to develop airplanes specially for a cryogenic fuel. In the given area the United States is already conducting certain practical studies. One of the most difficult problems is the development of new design pumps, since liquid hydrogen possesses poor lubricating properties and ordinary pumps will be unable to deliver the cryogenic fuel. For example, one of the particular features of the pumps being developed by the AirResearch firm is the use of elastic (pliable) bearings in them.

Research is also being carried out on the ways to solve the problem of transporting hydrogen to the airfields and airports. Its transporting in a liquid state is undesirable as it entails great losses. For this reason, they have proposed delivering the hydrogen to consumption areas in a gaseous form, to liquify it on the spot (in particular, by using nuclear energy) and to fuel the planes through pipelines with a vacuum casing. The estimates made by foreign specialists indicate that in fueling the aircraft tanks the hydrogen losses in evaporation will be around 15 percent. In their opinion, it is advisable to return the hydrogen evaporated in the fueling to the liquification system.

The demand for cheap energy is a major difficulty in obtaining liquid hydrogen directly at the consumption point. One of the ways for reducing the cost of its production is to produce such a side product as heavy water (deuterium oxide).

The research and development being conducted in the capitalist countries in the area of new aviation fuels, including cryogenic ones, indicates that the sphere of interests for the military leadership of these states encompasses an ever-broader range of scientific and practical problems the solving of which will serve the cause of further increasing their military might.

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REDUCED FLIGHT TIME FOR U.S. SAC AIRCRAFT NOTED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 p 58

[Article by Col V. Petrov: "The 'Shortage' of Flying Time in the U.S. Air Force SAC"]

[Text] One of the important criteria for assessing the combat readiness of the U.S. Air Force as a whole and primarily the Strategic Air Command (SAC) air units and subunits as a component part of the U.S. "strategic nuclear triad," is considered to be, by American military specialists, the flight training level of their crews. However, as the foreign press has pointed out, they are very concerned over the fact that in the United States in recent years there has been a tendency for a drop in the amount of money allocated for the operation and maintenance of aviation equipment and this has led to a decline in the flying time of the aircraft crews.

At the same time, the tasks have broadened, the tactics of the SAC planes has changed, while their weapons and on-board equipment have been modernized and become more complex. All of this requires a constant increase in the crew flying time. In particular, over the next 5 or 6 years, in the opinion of the mentioned specialists, it is essential on an annual average to increase the crew flying time by 13 percent. For this reason, the flying time standards for the SAC planes (for the basic types of combat aircraft in service) adopted by the present American administration which, incidentally, has been the most "generous" for military expenditures over all U.S. history, according to the estimates of these experts, do not correspond to present-day needs. Thus, at the end of 1981, the magazine WORLD AEROSPACE WEEKLY, published the three diagrams and commentaries on them. In these diagrams the black columns show the annual planned (up to the 1986 fiscal year) flying time of the B-52, the FB-111 and KS-135 planes while the striped sections of them designated the number of flying hours (the so-called "shortage" of flight time) which, in the estimates of American specialists, were lacking to maintain the necessary combat readiness level of the SAC units and subunits.

From the first diagram (Fig. 1) and the commentary on it it follows that the total number of flying hours for all the heavy B-52 strategic bombers in service has been dropping while calculated per plane it remains approximately constant and will equal around 400 hours per year while the "shortage" will be 34 percent.

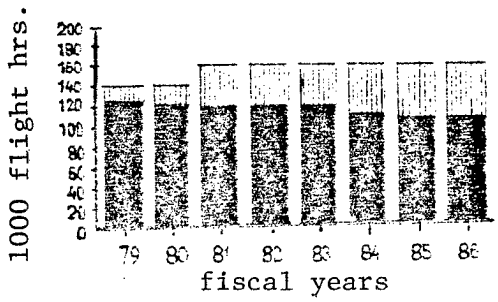

Fig. 1.

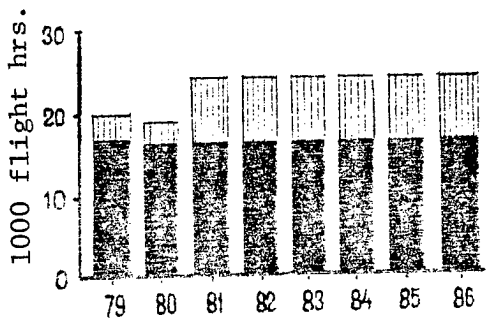

Fig. 2.

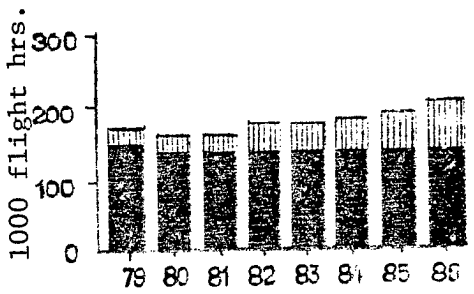

Fig. 3.

Figs. 1, 2, 3

Diagrams of approved and required flying hours for B-52, FB-111 and KS-135 aircraft (from top to bottom).

As for the flying time of the FB-111 medium strategic bombers (Fig. 2), it has remained approximately on the same level as in 1980 (around 300 hours per plane) but again with a "shortage" of 28 percent.

The third diagram (Fig. 3) shows the planned flying time of the KS-135 tanker planes (an average of 270 hours per plane). Here, from the viewpoint of the American experts, the "shortage" of flying time is also 28 percent.

In endeavoring to obtain funds to eliminate these "shortages," the Pentagon bosses are endeavoring to justify their actions not only by the necessity of ensuring high combat readiness for strategic aviation but also by a concern for retaining the personnel. Here they have stated that the reduction in crew flying time has told unfavorably on the effectiveness of the measures being carried out to reduce the accident rate and has led to increased losses of aviation equipment and personnel.

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BRIEF DESCRIPTION GIVEN FOR NORWEGIAN NAVAL FORCES

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 59-63

[Article by Capt 2d Rank Yu. Galkin and Capt 3d Rank S. Grechin: "The Norwegian Navy"]

[Text] Norway holds an advantageous strategic position in the north of Europe in direct proximity to the Soviet Arctic. It has a common border with the Soviet Union and this, in the opinion of the NATO leadership, even in peacetime provides great opportunities for conducting electronic reconnaissance and collecting information on the USSR and the other Warsaw Pact states. Considering its geographic position as well as the rather favorable climatic conditions (nonfreezing ports and fjords), NATO feels that in the event of an outbreak of military actions in Europe, Norwegian territory will be used for the deployment of the bloc's Joint Armed Forces (JAF). Here it would be convenient to control the lines of communications connecting the Atlantic and Arctic Oceans, the Baltic and North Seas.

In viewing membership in NATO as a "guarantee of national security," the nation's ruling circles have been actively in favor of increasing military might on the northern flank. They support the aggressive aspirations of this bloc and the building up of their own armed forces, including the navy, has been completely subordinate to its interests.

The navy has been developed within a long-range program for 1979-1993 and is aimed at further increasing the combat capability of the fleet forces and shore artillery by putting more advanced weapons models into service.

In terms of the number of personnel and fighting strength the Norwegian Navy holds second place among the fleets of the Scandinavian countries (after Sweden) and comprises the basis for forming the joint NATO Naval Forces in northern and southern Norway. In accord with the plans of the bloc's command, there are plans to strengthen these forces using the navies of the United States, Great Britain and the other NATO states.

In peacetime the Norwegian Navy is under national authority but in the event of war and for the period of conducting exercises and maneuvers it is turned over to the bloc's JAF. As has been stated in the foreign press, the navy is to carry out the following basic missions: to combat the enemy naval forces, to disrupt its lines of communications, to support the ground forces, to conduct

landing operations, to protect its own lines of communications and provide antilanding defenses and defenses for the oil and gas fields in the North and Norwegian Seas.

Organization. The Norwegian Navy is an independent armed service. It is headed by a chief inspector (commander) of the Navy who provides administrative leadership through the Navy Staff in Oslo. He is subordinate to the commander-in-chief of the armed forces and is responsible for the state and organizational development of the Navy, for organization, combat training and logistics. Subordinate to the chief inspector in administrative terms are the navy commanders in Northern and Southern Norway as well as the commanders of the naval zones.

The operational control and utilization of the Navy are organized by the commander-in-chief of the nation's armed forces through the commanders of the armed forces and the navy in Southern and Northern Norway.

The Navy includes the fleet and shore artillery. Also operationally subordinate to the Navy Command are a squadron of shore-based patrol aviation (seven Orion aircraft) and a search and rescue squadron (ten Seeking helicopters) from the Air Force, a Coast Guard Service and subunits of the marine "Hjemvaern."

The Norwegian Navy is not extensive in composition but is balanced. It includes submarines, surface ships and launches which in organizational terms have been reduced to the following divisions: submarines (two), frigates (two), small ASW ships (one), minelayer (one), minesweeper (one), landing ships (one), coast guard ships (two) as well as two flotillas of missile launches.

As has been stated in the Western press, the nation's Navy has 15 diesel submarines, 5 antimissile frigates, 2 small ASW ships, 7 landing ships and 13 minesweeping ships as well as 40 missile launches, 8 torpedo boats and 3 patrol boats. The combat and routine activities of the navy are supported by approximately 20 auxiliary vessels.

The submarines are represented by one class, "Kobben" (Fig. 1 [not reproduced]). These were built in West Germany in the mid-1960's. Their submerged displacement is 435 tons, surface speed is 10 knots, submerged is 17 knots, weapons are eight 533-mm torpedo tubes and a crew of 18 men. At present, they are being modernized in the aim of being kept in service until the end of the current decade. Then they will be replaced by new submarines of the 210 design and this is also being developed in West Germany. According to the most recent data in the foreign press, there are plans to build six such boats and the first will be turned over to the Navy in 1989.

In the frigate class are the antimissile ships of the "Oslo" class and five of these were put into service in 1966-1967. The ships of the given class have a total displacement of 1,745 tons, a length of 96.6 m, a speed of up to 25 knots, weapons including six launchers of the Penguin antishipping missiles, and eight-unit launcher of Sea Sparrow antiaircraft missiles, two 76-mm twin-gun artillery units, two 3-tube torpedo launchers for antisubmarine torpedoes and

a Terne depth charge launcher (DCL). The crew is 151 men. In 1973-1975, the frigates were re-equipped and the next modernization is planned for the mid-1980's.

The small ASW ships (two classes of "Sleipner") were commissioned by the Navy in 1966-1967. Their total displacement is 780 tons, speed is 20 knots, weapons include 76- and 40-mm artillery units, the Terne DCL and two 3-tube torpedo launches; the crew is 62 men. By the end of the 1980's these should be taken out of navy service due to their long service life and the inadvisability of repairs and modernization. The construction of new ships of this class, like the frigates, is not planned for the next few years.

The most numerous class of ships in the Norwegian Navy is the missile and torpedo boats. At present, judging from materials in the foreign press, there are 40 missile boats (14 of the "Hawk" class, 20 of the "Storn" and six of the "Snegg") and eight torpedo boats (of the "Tjeld" class). The most modern missile boats are boats of the "Hawk" class (Fig. 2 [not reproduced]) built in 1977-1980 (total displacement of 155 tons, speed up to 35 knots, weapons include six launchers of the of the Penguin antishipping missiles, 40- and 20-mm artillery mounts and two 533-mm single-tube torpedo launchers.

The torpedo boats are armed with 40- and 20-mm artillery guns and four 533-mm single-tube torpedo launchers.

According to information in the foreign press, the command of the Norwegian Navy is planning to replace the obsolete missile boats of the "Snegg" and "Storn" classes with more advanced ones. The new boats are to carry more effective air defense weapons.

The narrow channels in the skerries, fjords and on the approaches to the bases, in the opinion of Western specialists, can become areas of concealed minelaying. For combating mines the navy has ten coastal minesweepers of the "Sauda" class which were commissioned in 1953-1955. Their total displacement is 384 tons, speed around 13 knots, weapons include two 20-mm artillery guns and various types of sweeps and a crew of 38 men. For laying minefields, for covering the Norwegian bases and ports, they employ minelayers of two classes "Vidar" (built in 1977-1978) and "Bergen" (1961). The most advanced are the ships of the "Vidar" class (Fig. 3 [not reproduced]), each having a total displacement of 1,673 tons, a speed up to 15 knots, and weapons of two 20-mm artillery guns; the ships can carry 300-400 mines. The foreign press has emphasized that the minesweepers will remain in the fleet until the mid-1980's and then will be replaced by new ships.

Amphibious landing operations are supported by seven tank landing vessels of the "Kvalsund" class. Their displacement is 590 tons, speed is 11 knots, and weapons include two or three 20-mm artillery pieces. The landing capacity is 7 tanks and up to 100 marines. The existing plans envisage that these ships will remain in service until the beginning of the 1990's.

The merchant fleet is the reserve of the Navy and a portion of its vessels, as the foreign press has announced, in wartime will be turned over to the Navy Command and used for supporting combat operations. The Norwegian maritime

fleet numbers approximately 2,400 ships with a total tonnage of around 22 million gross registered tons and holds fourth place among the countries of the capitalist world.

The Norwegian coast and the coastal territories have been divided into nine naval zones. The commanders of these zones bear responsibility for all types of defense of the coast, naval bases and ports, for creating conditions for the basing and mooring of the ships and vessels, for defense of the sea lines of communications and for organizing search and rescue work.

Norway possesses an extensive system of naval bases and ports which combined with the numerous natural bays and gulfs ensure the dispersed basing of both the national and joint NATO navies. On its territory there are three naval bases (Hakonsvaern which is the main one, as well as Olafsvaern and Ramsund), nine base points and 35 major ports. Western military specialists have pointed out that a characteristic feature of the Norwegian navy bases and base points is the placement of a significant portion of the coastal installations and facilities in underground and rock shelters.

The coastal artillery is a component of the Navy and has the job of combating enemy surface targets in the coastal zone. Its basic organizational formation is a fort which includes artillery batteries armed with artillery pieces of varying caliber (105 and 155 mm). The foreign press has pointed out that at present there are 40 ports (15 in Northern Norway and 25 in Southern), 19 of them in operation while the remainder are mothballed. Antiaircraft batteries provide the air cover for the forts. Coastal torpedo batteries have been mounted on likely landing sections of the coast, and controllable minefields in the coastal waters. As the NATO military specialists point out, the weapons of a larger portion of the artillery batteries are out of date and need replacing or modernizing. For this reason, the Norwegian Navy Command is re-equipping and rearming a portion of the forts. These are receiving missile units from which coastal missile batteries are to be formed. In addition, there are plans to broaden the capabilities and increase the effectiveness of the coastal radar surveillance system by building new stations and modernizing the existing ones.

Manning and training of the personnel. According to data in the foreign press, the Navy has 9,400 men, including 2,000 in the coastal artillery. In wartime, by mobilizing the reservists their number can rise to 20,000.

The Navy is manned on the basis of the law governing universal military service and by recruitment. Males 19 years of age are subject to induction for active military service (for 15 months). Volunteers sign a contract for 6 years.

The training of rank-and-file personnel in the ship specialties (gunnery personnel, torpedomen, miners, radio operators, electricians and so forth) is provided in the Navy training centers in Hakonsvaern and Horten. The length of training for persons in regular service is 13 weeks and for contract servicemen up to 20. Those inducted into the coastal artillery are trained in special basic training centers for the coastal artillery personnel in Southern and Northern Norway.

The navy officer personnel is divided into career officers and reserve officers. The career officers (both for the fleet and for the coastal artillery) for 4 years and 3 months train in the naval school (in Bergen) on its three faculties: command, engineer and rear services. The annual graduating class is around 25 officers. Graduates are awarded the rank of lieutenant. Those who are going into the coastal artillery in addition complete special courses. Further training for officers is provided in the Navy Staff School and the Higher Defense School (both in Oslo) as well as in the corresponding institutions of learning in other NATO countries.

The reserve officers are trained at the naval school (the faculties have courses for reserve officer training), in the training center for navy junior officer personnel and in the coastal artillery junior officer school. The period of instruction is around a year. Graduates are awarded the military rank of reserve fenrik and they are obliged to serve at least a year in the Navy units and subunits. Then the reserve officers can be discharged into the reserve, continue serving under contract or become career officers (upon completion of the naval school). Each year the Norwegian Navy trains around 30 reserve officers.

Operational and combat training carried out under the plans of the commands of both the Norwegian Navy and the joint NATO navies is aimed at working through the missions which they should carry out in wartime. For this purpose, the fleet ship formations and the coastal units take part in independent and joint exercises for the Armed Services. In them particular attention is given to developing cooperation with the ground forces and the air forces in carrying out antilanding missions.

Foreign military specialists have pointed out that the Norwegian Navy is represented basically by light forces and that this makes it possible for it to conduct active combat operations in extensive areas of the Atlantic, the Norwegian and North Seas and in the waters of the Arctic Ocean. In the event of war there are plans to employ it in cooperation with the navies of the other NATO countries as part of the joint naval forces. For this reason, even in peacetime, the Norwegian Navy has been widely involved in exercises of the bloc's JAF in the Atlantic and in the Northern European Theater of War. Thus, in 1982, the most important of these were "Blue Harrier," "Bright Horizon," "Northern Wedding" and "Bold Guard." Characteristically, virtually all the exercises were conducted close to the nation's coast and even in its territory.

From information in the foreign press, the Coast Guard and Navy "Hjemvaern" are also involved in carrying out the missions entrusted to the Navy.

The Coast Guard Service was established in April 1977 on the basis of the Fish Inspection Service. It, as was pointed out by the nation's minister of defense, is a basic instrument of state policy to strengthen national sovereignty within the 200-mile economic zone and on the continental shelf as well as monitoring the observance of international and Norwegian laws by all ships and vessels. Moreover, it is entrusted with the defense of the oil and gas installations in the North and Norwegian Seas and participates in search and rescue operations at sea.

The service is headed by a Coast Guard inspector who is under the Chief Inspector of the Navy. He is responsible for ensuring the basing and disposition of the Coast Guard resources, for the training and instruction of the personnel and so forth.

Operational leadership over the Coast Guard is provided by the commander-in-chief of the Norwegian Armed Forces through the commanders of the armed forces and the naval commanders in Northern and Southern Norway. The sea-going forces of the Coast Guard include six special ships ("Nornen," two of the "Farm" class and three of the "Nordkapp" class) and seven chartered trawlers which are armed with a 40-mm artillery gun.

The most modern are the ships of the "Nordkapp" class built in 1981-1982. Their basic specifications are: standard displacement of 2,910 tons, full displacement of 3,240 tons; length 105.5 m, beam 14.6 m, draft 4.6 m; power of the four diesels is 14,000 horsepower; speed is up to 23 knots; weapons include one 57- and four 20-mm artillery pieces, two 3-tube torpedo launchers for anti-submarine torpedoes, six depth charge launchers and a Lynx ASW helicopter. The crew is 46 men. In wartime the ships will carry the Penguin antishipping missiles and Sea Sparrow antiaircraft missiles.

Orion airplanes and Lynx helicopters which are part of the Air Force are also employed in the interests of the Coast Guard. Considering the nature of the missions carried out, the nation's government gives great attention to the development of the Coast Guard resources. It has been announced that at present they are reviewing the question of building a fourth ship of the "Nordkapp" class and in the course of the planned major overhauls they plan to carry out partial modernization of the old ships as well as expand the capabilities of the basing system.

The Navy "Hjemvaern" is a component part of the "Hjemvaern" of the nation's armed forces. This is a mass paramilitary organization (a membership of around 7,500 persons). It is manned on a volunteer basis by the territorial principle from reliable persons 18-55 years of age. Its basic tasks are the following: observing the territorial waters and notifying its forces of the appearance of enemy ships; security of naval bases and ports and covering likely landing areas on the coast; laying minefields and covering them together with the regular Navy; evacuation of the civilian population; manning up the landing vessels and launches when necessary. The command of the "Hjemvaern" has available re-equipped fishing boats armed with small-caliber artillery guns and machine guns.

The above-given information on the condition and development prospects as well as on the areas of operational and combat training for the Norwegian Navy show the great importance which is given to the employment of these naval forces and Norwegian territory in the aggressive plans of the NATO military-political leadership.

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NATO SABOTAGE DEVICES, DEMOLITION CHARGES DESCRIBED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 63-67

[Article by Engr-Col Yu. Dem'yanov: "Limpet Mines and Scuttling Charges"]

[Text] The reconnaissance and sabotage subunits in the navies of the aggressive NATO bloc are armed by various mines and special charges which operate under water. These are used by sabotage groups for destroying important stationary structures (piers and bridges), for knocking out ships at anchor as well as in combating enemy frogmen. Among the demolition charges one can also put the explosives designed for clearing passages in antilanding obstacles.

Limpet mines are employed for knocking out stationary installations, weapons and combat equipment as well as various types of ships. As a rule, they have magnets for attaching to the metal surface of the object to be demolished and a delayed action fuse.

The English limpet mines appeared during the years of World War II. The foreign press has emphasized that due to their simple design, cheapness of manufacturing and simplicity of action, such mines are still in service at present (Fig. 1 [not reproduced]). They have a prismatic brass housing. Along both its sides on a guide are located six horseshoe-shaped magnets for placement on the object. Each magnet is fastened to the guide using an elastic (rubber) joint and this makes it possible for them to hold more securely to a somewhat uneven surface. At both ends of the housing lie threaded detonator sockets for inserting the chemical delayed action fuses.

The charge of the mine is a plastic explosive weighing 1.2 kg. The tetryl slab which is regulation in the English Armed Forces is the booster charge for the main charge.

For activating the mine, the frogman activates the fuses and for this he screws in the fuse inserter rods (two fuses in one mine provide greater reliability for setting off the ammunition). Each rod crushes a capsule with an acid which works on an element which holds the pin in the inserted position. After the designated time determined by the concentration of acid, the element holding the pin is crushed and the pin strikes the igniter cap.

Another, more advanced version of the limpet mine was developed at the end of the 1970's (weight 6.5 kg, diameter of housing 265 mm, height 120 mm). It has a circular housing filled with explosive and seven magnets located in the base. With them the mine can be fastened not only onto smooth but also slightly curved surfaces of the object to be demolished. For fastening to other surfaces, a twine is used tied into rope carrying handles. The mine employs a delayed action fuse with a clock mechanism by which it is possible to precisely maintain the delay time for exploding the ammunition.

For training personnel in the use of the new mine, a training model (Fig. 2 [not reproduced]) has been developed and tested and its production should be started in 1982. It has the same weight and size specifications as a combat one. But in the training version of the mine there is a window with a xenon light which serves as an indicator of the "activating" of the mine. In its housing are also the cocking mechanism and the anti-lift device which are activated by two cords which protrude outside. Moreover, on the housing there is a lever for setting the time of the delay with a liquid crystal display used to indicate the set time for the delay of the "explosion." The electrical components of the mine are powered by four dry cells of 1.5 volt each providing continuous operation for 50 hours (here the required current is 5 milliamps).

For activating the mine using the setting lever they set the required delay time. First the minutes are set, then the hours and then the button is pressed for activating the anti-lift device. Then the mine is fastened to the object and the trip rope is pulled. After the designated time has lapsed or in attempting to remove it before the time, the mine "goes off" and this is determined from the flashing of the xenon light which halts after the power has been shut off. If the light is not shut off, it will operate for around 2 hours until the energy in the power sources has been used up.

As in the combat version, the training version has a safety device which delays up to 20 minutes the final cocking of the mine fuse after its setting. The design of the housing and the other components of the mine permit it to be set in sea water at depths to 30 m.

The Belgian delayed action mines have an explosive charge with a clock fuse and are designed to be used in water at depths up to 10 m depending upon the specific task. The mines include also a small explosive slab used as the basic charge or a booster charge for a more powerful charge.

Three versions of fuses have been developed and these differ only in the time of the explosion delay. They all have a low-noise clock delay mechanism and are enclosed in a hermetic plastic housing (diameter around 70 mm, height 100 mm, total weight around 250 gm). The delay time of the first model is up to 100 minutes (a setting inverval of 1 minute), the second up to 100 hours (1 hour) and the third up to 100 days (1 day). Mines with such fuses are activated by setting the required delay time of the explosion on the dial and connecting the electric detonator and the power source. For activating the fuse a safety device must be removed.

As the basic charge in the mine, it is possible, in particular, to employ the regulation 400-gm demolition slabs in a plastic casing (dimensions 7x7x5 cm).

Charges for demolishing structures are set by frogmen and are placed at the base of the object to be demolished, that is, the walls of a pier, the supports of a dock, bridge and so forth. These can be placed directly from the object (if the situation permits) with the aid of a light pole or a strong rope so that they lie close to the surface of the object to be demolished.

Such charges are ignited by a safety fuse detonator set or a delayed action fuse designed for going off after a strictly set time. For the necessary reliability of the charge's detonation, it is made hermetic.

Usually the charge is enclosed in a soft casing with rope handles for convenient transporting on land and under water. In a number of instances small floats can be attached to the outside and these facilitate its transporting in the water.

Prismatic-shaped charges are manufactured from slabs of regulation explosives. For example, the U.S. Marines employ regulation demolition slabs of C-4 plastic explosive (weight 1.13 kg, dimensions 30x5x5 cm). Sometimes Bangalore torpedoes are employed and these have, as a rule, a soft synthetic or fabric casing and are filled with plastic explosive. Thus, in a Swedish charge the length of an element of which is around 2 m, on the ends they have made catches which make it possible to connect several elements into a single whole.

According to the data of the foreign press, recently the foreign military industry has begun the production of more effective means of demolition. In particular, Great Britain has developed and put into service flexible shaped Bangalore torpedoes with which it is possible to make holes in reinforced concrete and stone structures as well as metal elements. Their advantage, in the opinion of foreign military specialists, is the more effective action, due to which the consumption of explosives is reduced. There are several models of the torpedoes (Fig. 3 [not reproduced]) each 2 m long and differing only in the amount of explosive per linear meter (10-180 gm). The foreign press has pointed out that the new device is also successfully employed under water and for its dependable action it is essential to seal with a special mastic the installed igniter cap and ends of the explosive charge which is enclosed in a lead casing. The results of testing the shaped Bangalore torpedoes are given in the table.

The weight of a linear meter of the lightest charge is 160 gm and the heaviest is 290 gm. In the opinion of Western specialists, the use of the new Bangalore torpedoes will make it possible to reduce the overall weight of the supplies delivered to the demolition site, however this is not reflected in the result.

Elongated mine-clearing charges are classified as explosives which are used by the U.S. Marine units for clearing passageways through anti-landing obstacles in conducting amphibious landing operations. The basic one is the M58 (Fig. 4 [not reproduced]) and which is a rope with cylindrical charges of C-4 plastic explosive strung on it. It is delivered to the obstacle by a powder-fueled rocket which is supplied with the charge in a steel container carried on a LVTP-7A1 amphibious tracked armored personnel carrier; this vehicle can carry up to three such charges. The rocket tows the charge to the obstacle, the charge is detonated in the water and as a result the mines located in the immediate proximity to go off or are knocked out while the nonexplosive anti-landing

obstacles are destroyed. It has been announced that one M58 charge can make an opening around 90 m long. If the obstacle has a greater length, several charges are placed across it in sequence.

Testing Results of Shaped Bangalore Torpedoes

Weight of 1 linear m of Explosive, gm	Thickness of Element Destroyed, mm			
	Steel	Aluminum	Reinforced Concrete	Wood
10	2	3	--	25
25	3	6	--	38-50
40	5	10	--	76
80	10	12	50	--
100	12	14	•	--
120	13	16	75	--
180	15	20	230 *	--

* Double bricklaying.

For clearing openings in nonexplosive anti-landing obstacles, American military specialists also plan to use special frogmen subunits which covertly approach the obstacles and destroy its elements using concentrated explosive charges.

Charges for combating frogmen. Along with the development of special devices designed for conducting various sabotage, some NATO countries have developed special weapons for combating enemy frogmen. These include chiefly small demolition charges with special fuses designed to explode within a set depth. Such charges are used by the reconnaissance and demolition subunits in the navies of all the bloc member countries. It has been emphasized that they are simple, inexpensive to produce and possess a rather high reliability and effectiveness of action.

The Spanish LM-2 and LM-60 charges are small devices of the same design like a hand grenade weighing 1.5 kg; in exploding under water they will damage a frogman within a range of 25 m.

In the LM-2 charge (Fig. 5), the cylindrical housing 85 mm in diameter and 170 mm long is loaded with 450 gm of explosive (trotyl, explosive B or hexotol). In its central part is located an explosive mechanism with a hydrostatic fuse which in storage is covered by a safety cap.

Before using, the safety cap is unscrewed from the charge, the safety pin is removed and it is thrown overboard. At the designated depth under the effect of the water pressure, an explosion occurs.

The LM-2 charge goes off at a depth of 10 m and the LM-60 at 60 m. According to data in the foreign press, testing has shown that both are characterized by rather high depth activating accuracy: for the first the minimal time is

7.3 seconds and the maximum is 9 seconds and for the second, respectively, 44 and 48 seconds. Testings have also confirmed their dependability and safety in handling. They do not go off in striking the water surface or also in shallow water where the depths are less than those for which the hydrostatic fuses are designed. In the course of acceptance testing it was determined that in exploding a charge will have a lethal effect on a frogman within a radius of 3-8 m and within a radius of 25 m will put him out of action.

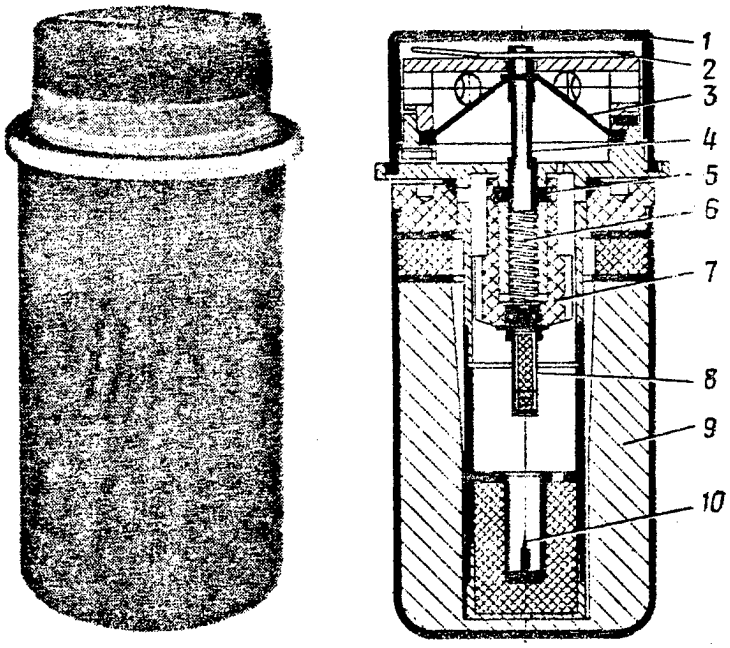

Fig. 5. Overall view and design of LM-2 demolition charge: 1--Safety cap; 2--Safety pin; 3--Conical diaphragm; 4--Stem; 5--Retaining ball; 6--Striker spring; 7--Bushing; 8--Igniter; 9--Explosive charge; 10--Firing pin.

Along with the development of new explosive charges, Spanish industry has also begun producing advanced fuses for them as well as for charges already in use. For example, the H2 fuse has just 17 parts including one spring and is equipped with a device for setting the depth for the charge to go off and this device does not require a special tool. The Western press has stated that this fuse can be employed with charges dropped from airplanes and helicopters. It is emphasized that the accuracy of its detonation is 5 percent of the designated depth. It is equipped with a device for setting 20 fixed depths within the limits of 30-600 m. Moreover, it can be moved from a cocked state to a safe position if the dropped charge has not reached a depth of 7 m.

The West German DM221 charge has been developed in two models which differ only in the weight of the employed explosive charge. In the light model it is 50 gm with a total weight of 800 gm and in the heavy one, 500 gm and 1.4 kg, respectively. The charge is enclosed in a hermetic housing 60 mm in diameter.

The fuse for both models is the same. It is activated by water pressure at a depth of around 6 m. In the future they propose using such charges not only to combat enemy frogmen but also as a signal device for communications with submarines as well as for igniting charges in destroying detected bottom mines. It has been announced that the DM221 charges have been positively assessed by specialists from a number of the NATO countries and are being purchased for the Belgian, Dutch and Danish navies.

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WEST GERMAN PENGUIN-B3 DISPOSAL SYSTEM DESCRIBED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 71-72

[Article by Capt 2d Rank (Res) V. Malov: "The Penguin-B3 Underwater Device"]

[Text] In 1982, the West German Navy conducted sea trials on a remote-controlled underwater device called the Penguin-B3 (Fig. 1 [not reproduced]) developed by the West German MBB/VFW Firm to be used on minesweepers. It is designed to search out, classify and destroy bottom or anchored mines and in terms of certain indicators is superior to the similar French PAP104 device which is used in the navies of a number of NATO countries as well as the Italian MIN-77.

The weight of the device with demolition charges is 1,350 kg, the length is 3.5 m, the diameter of the housing is 0.7 m, maximum width is 1.5 m, the height is 1.4 m, the operating speed is 6 knots, maximum speed is 8 knots, diving depth is down to 100 m and the range is 1-3 hours; it can be employed in up to a 4-point sea.

The fiberglass housing which has a torpedo-like shape is divided into three parts which are bolted together (Fig. 2). In the nose is a television camera operating with a low illumination level or a sonar in the ultrasound band providing for the operation of the device in cloudy water, as well as a short-range sonar and a portion of the storage batteries. In the mid-section of the housing lie the remaining storage batteries, the vertical thruster, the buoyancy tank and depth finder. On the outside of the housing the forward releasable demolition charge is fastened underneath the mid-section. In the rear there is a tall vertical fin and along the sides on pylons are two propulsion unit pods and underneath the rear releasable charge.

The propulsion units and thruster employ electronic motors driven by the storage batteries. The device maneuvers in a horizontal plane by altering the turning speed of the propulsion unit propellers and in a vertical plane using the diving rudders located in the water jets created by the propellers. The verical thruster is activated automatically with a drop in the device's speed, when the effectiveness of the diving rudders declines sharply.

For a power supply in all the on-board systems they employ nickel-cadmium (these operate for 1 hour) or silver-zinc batteries (3 hours) and these for recharging

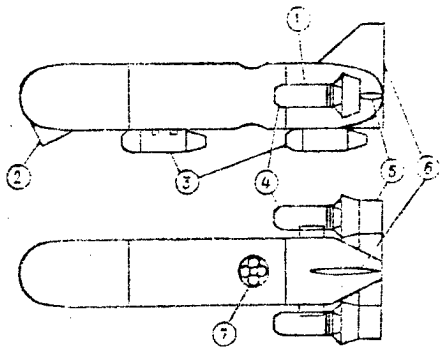

Fig. 2. Diagram of the Penguin-B3 underwater device: 1--Propulsion unit; 2--Television camera; 3--Releasable demolition charges; 4--Illuminating searchlights; 5--Diving rudders; 6--Vertical keel; 7--Thruster.

on special tracks can be slid out and removed from the housing in disconnecting its forward and mid-sections. When necessary it is also possible to recharge the batteries inside the housing. Their power is 90 percent restored in 1 hour of charging. Thus, a minesweeper equipped with two devices and a set of reserve batteries can search for and destroy mines continuously using just one of the devices.

The television camera has a narrow field of vision along the course of the device's movement and a broad one downwards. Its operation is ensured by the illuminating lights which are in the front part of the propulsion unit pods. The remote control signals and the readings of all the sensors are transmitted in a digital form over a 600-m cable connecting the device to the main control board on the minesweeper. In the breaking of the cable, the Penguin-B3 which has a slight positive buoyancy surfaces.

After the detection of a mine by the ship sonar, the device is lowered from the stern into the water and on the surface or close to it heads toward the location of the mine. It is controlled from the minesweeper deck using a portable control. In approaching the mine's location, control of the device is turned over to the main board, the device itself dives to the set depth, after which its sonar is turned on which locks on the mine. The device closes with it automatically according to a special program. The operator makes a certain adjustment only when necessary.

In the opinion of foreign military specialists, the Penguin-B3 can be directed more quickly and dependably to a detected mine than the PAP104. The sonic depth finder along with the pressure depth gauge ensure the automatic maintaining of the set depth for the traveling of the device and the hovering over the mine and they prevent the too close approach to the bottom and the touching of it.

In approaching the mine, the television camera and lights (or the ultrasound vision set) are turned on, the device approaches the mine from above, the operator using the TV screen on the control board identifies its type and drops one of the explosive charges (weighing 120 kg) with a delayed action fuse next to it. Then the device moves off a safe distance and the detonating of the charge destroys the mine.

For the cutting of mine mooring cables, including those equipped with antisweep devices, a special explosive cutter has been developed for the Penguin-B3 device and this can be mounted in the place of the forward releasable demolition charge. The device is guided to the mine mooring cable using the

television camera and the explosive cutter is attached to the cable with a special clamp.

The foreign press has pointed out that the manufacturing firm is presently conducting research in the aim of increasing the diving depth of this device or developing another, deeper water model.

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INNOVATIONS IN WESTERN MILITARY TECHNOLOGY, EQUIPMENT GIVEN

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 83 pp 75-78

[A round-up of Western military developments under the heading "Announcements, Events, Facts"]

[Text] An American Rifle Grenade Launcher--by Lt Col G. Andreyev

The Command of the U.S. Ground Forces has given significant attention to developing new, small-sized and effective weapons models designed chiefly for conducting combat operations in population points. Thus, the American Army is carrying out troop testing of a rifle grenade launcher called RAW (Rifleman's Assault Weapon) developed by the Brunswick firm. It can be used to hit personnel, weapons and combat equipment, for making holes in the walls of buildings and walls, for damaging protective structures, bridges and so forth. The effective range of fire is up to 200 m.

The grenade launcher which consists of a mount and a striker mechanism is fastened onto the muzzle of a M16A1 automatic rifle (see the photograph [not reproduced]). The RAW fires a HEAT rocket (weighing 1.36 kg). This consists of a spherical housing (diameter 140 mm) made from a light alloy and a launcher. In the housing of the grenade are: the explosive charge, a fuse, an igniter cap and a jet engine. The launcher is a hollow cylinder with two L-shaped tubular nozzles and a guide rod.

The grenade is fired with an ordinary combat cartridge. At the moment of the shot, a portion of the powder gases through the mount's gas escape channel activates the striker mechanism which heats the igniter cap of the rocket engine. The powder gases formed, in escaping through the L-shaped nozzles, provide the grenade's acceleration, it then breaks away from the launcher and flies (in spinning) along a flat trajectory.

For the RAW grenade launcher they have developed high explosive, fragmentation, incendiary, smoke and chemical grenades which possess, as American specialists feel, increased effectiveness near the target. For example, a high explosive grenade can make an opening 350 mm in diameter in a reinforced concrete slab 200 mm thick.

As has been announced in the foreign press, the RAW grenade launcher, in the event of the successful conclusion of testing, can be put in service in the subunits of the U.S. Army and Marines.

A New Variation of the Israeli Kfir Fighter--by Col I. Karenin

According to announcements in the Western press, in Israel the firm Israel Aircraft Industries has developed the production of a new model of the multi-purpose Kfir tactical fighter which has been named the Kfir-C.7. In addition, a two-seat Kfir-TC.7 trainer is to be produced. It is felt that in contrast to the previous modification of the Kfir-C.2, the Kfir-C.7 fighter has improved flight performance and accuracy of the on-board weapons control system. This has been achieved, as the specialists of the firm have stated, by modernizing ceratin of the fighter's systems.

In particular, the modernizing of the America-produced J79-J1E engine has increased the maximum thrust under afterburner conditions by almost 450 kg and the thrust-to-weight ratio (with an increase in the take-off weight by 1,540 kg) by 4 percent. The combat range of the Kfir-C.7 with a fuel reserve of 20 minutes is: 775 km in intercepting air targets, 880 km in air patrolling for 60 minutes, and 1,180 km in attacking ground targets. Israeli experts feel that the combat radius will be increased by another 30 percent if the plane is equipped with a mid-air fueling system. The fuel system of the Kfir-C.7 makes it possible to carry out single-point pressurized ground fueling in 6 minutes.

It has also been announced that the aircraft's sight and navigation equipment has undergone significant modernization. The inertial navigation system carried by the plane provides an opportunity to calculate the route with an accuracy of around 1 km per hour of flight and to automatically drop the weapons with a circular probable error not exceeding a 5-m radius. Moreover, the on-board equipment ensures the use of various guided weapons, including with a laser guidance system.

The English Matilda Electronic Reconnaissance Station--by Engr-Capt 1st Rank P. Grinev

In the estimate of the command of the NATO navies, at present the greatest threat for ships at sea is the ship-to-ship and air-to-ship guided anti-ship missiles. For this reason, the problem of promptly detecting a missile attack has assumed extreme importance for carrying out an avoidance maneuver and setting passive interference for the missile homing heads. One of the basic ways for detecting the anti-ship missiles is the electronic reconnaissance radars.

For small displacement ships (up to 1,000 tons) the English MEL firm on the basis of the Suzy radars has developed a simplified model called Matilda which provides for the search, interception and analysis of pulsed and continuous signals, the classification of types and rough direction finding for the sources of their radiation, warning of a threat as well as the giving of target designation for the setting of passive interference. The station operates automatically in a frequency band of 7.5-18 gigahertz, it has a range of up to 15 km and is used together with the ship Protein and Philax jammers.

The Matilda Station includes an antenna system, a wideband tuned radio-frequency receiver which is compatible with the antenna, a digital processor and a CRT display of the radio electronic situation. The mast-mounted four-element antenna is in a dome of reinforced fiberglass and provides monopulse direction finding for the source of radiation for judging the direction of the missile attack. The processor which can be located in any ship quarters processes the received video signals and assesses the type of sources from the operating frequency range and from the pulse repetition length and frequency. In it is an algorithm for selecting the one radiation source which is the most dangerous from all those detected. Warning signals of a threat and the data for the passive jamming system are given in receiving more than 250 pulses with the same parameters including amplitude (but at least in 500 milliseconds) from the same direction. In the event of intercepting continuous radiation, its duration should exceed 100 milliseconds. The data on the direction of the threat are displayed in the form of an illuminated spatial sector.

In the opinion of foreign specialists, by excluding the operator from the work cycle of the Matilda Station, it has been possible to shorten the station's response to one second. It is felt that this station provides preparation to repel an attack by low-flying anti-ship missiles in 30 seconds. During this period unguided missiles are fired off with dipole reflectors and infrared decoys in the direction indicated by the Matilda Station and the ship executes an avoidance maneuver.

Telemine Torpedo Mine--by Maj (Res) G. Atamanov

Since 1982, the Swiss firm Texi, upon orders of the Argentine Navy, has been developing a bottom remote controlled torpedo mine called the "Telemine" (length of housing 5 m, greatest diameter 0.55 m, complete weight 650 kg, including weight of combat charge 170 kg). As representatives of the firm have stated, this is designed to protect coastal waters and can cover an area 200 km long (100 km in each direction). The mine is made in the housing of the manned torpedo employed by the Italian Navy in World War II (see the diagram). The housing is manufactured from 3-mm aluminum and on the outside is covered with neoprene rubber 10 mm thick and on the inside by a material on a polyurethane base for absorbing acoustical radiation. The energy source is lithium or silver-zinc batteries which power a 4.5-kilowatt engine and this can drive the torpedo mine up to 100 km at a maximum speed of 20 knots.

The "Telemine is to be installed on the sea floor at depths of around 150 m, where it can remain in an inactive state for up to 2 years. When necessary it can be activated by acoustical signals transmitted from submarines or surface vessels over a range of up to 40 km. After receiving such a signal, the ballast is dropped from the mine which surfaces in such a manner that above the water level one can see only a portion of the antenna of the radio control channel fastened to the television camera module.

In the beginning and middle sections of the route the torpedo mine is guided by a program which is set from the control board located on an aircraft, ship, submarine or at a shore control center. From a single control board it is possible to control five such torpedo mines simultaneously. Provision has been made for monitoring the operation of the torpedo mine and changing the program

at any stage of movement. It can be controlled from an aircraft in flying at an altitude of 9,000 m and with a maximum distance of 500 km from the target.

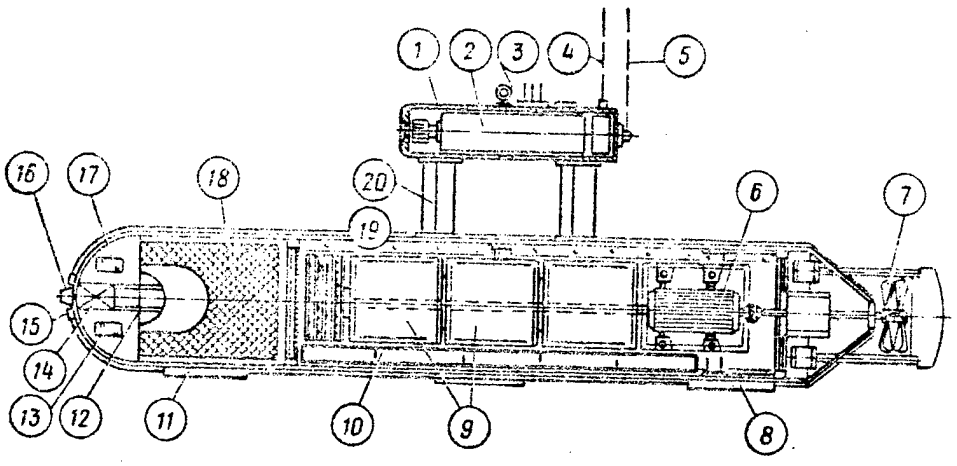

Diagram of Torpedo Mine: 1--Housing of television camera; 2--Television camera; 3--Antenna for receiving radar signal; 4--Receiver antenna; 5--Transmitting antenna; 6--Electric motor; 7--Two counterturning propellers; 8--Ballast; 9--Storage battery; 10--Inner ballast tank; 11--Emergency ballast; 12--Detonator; 13--Sonar receiver; 14--Magnetic and acoustic proximity fuses; 15--Acoustic sensor for automatic guidance; 16--Percussion fuse; 17--Navigation system sensor; 18--Charge; 19--Housing; 20--Extension legs.

Guidance on the terminal leg of the route of 20-500 m is provided by using the television camera located in a special module which is mounted outside the mine's housing on extension legs and the passive radar and acoustical systems.

Having approached 500 m from the target, the torpedo mine surfaces so that the television camera module is above the sea surface. With the aid of this TV camera capable of operating under low illumination conditions, an image of the situation is transmitted to the control board and from here control signals are received back by the torpedo mine. At a distance of 20 m from the target, the passive acoustical and radar sensors of the guidance system utilize the acoustical and radar signals received from the target ship.

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